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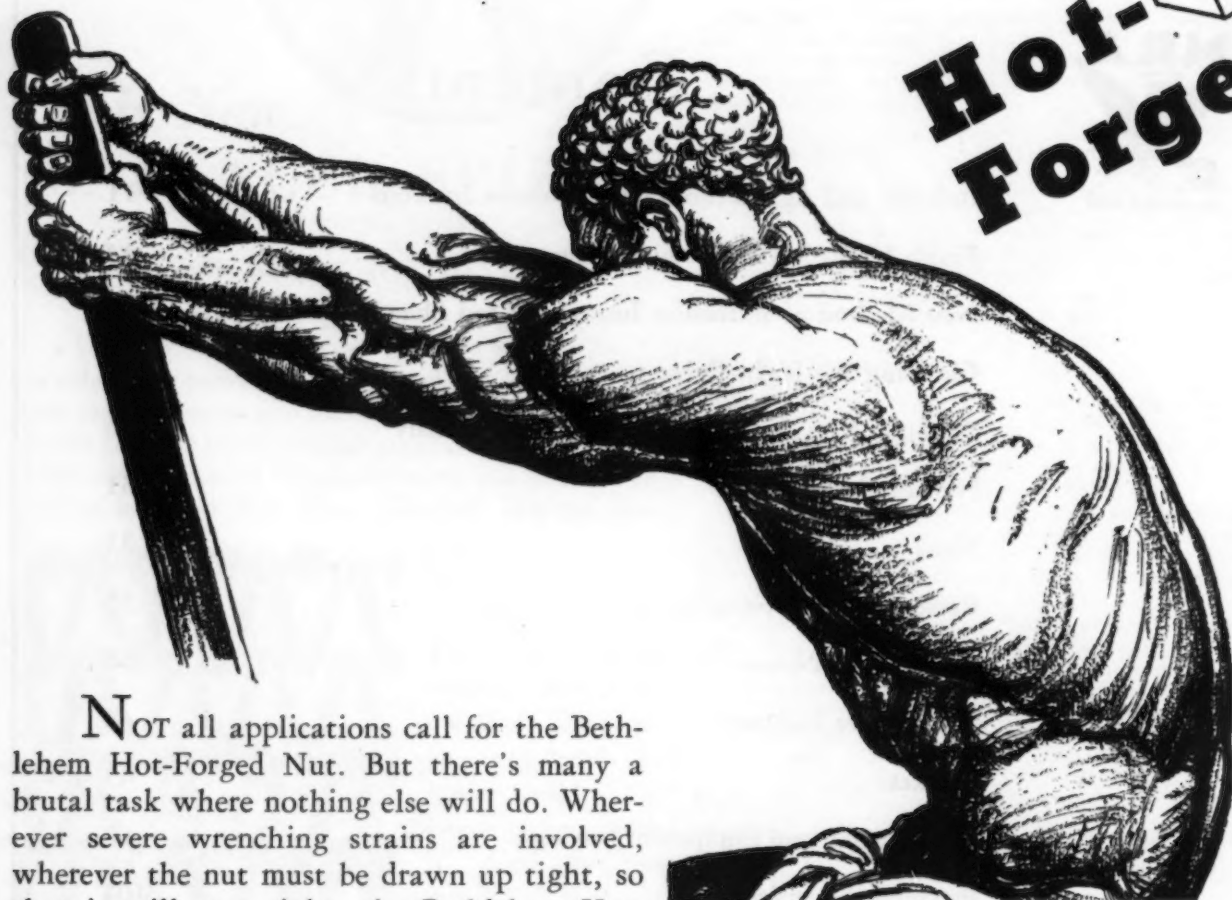
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Industry and Agriculture Have Common Interests; They Should Unite to Defend Self-Government and to Oppose Regimentation

By JOHN H. VAN DEVENTER
Editor, THE IRON AGE

It has been one of the accepted principles of management both commercial and political, that if you would impose responsibility you must also convey authority. In largely permitting industry to write its own codes, subject, of course, to the specific terms of the Recovery Act, the NRA, I believe, made a wise move. One is not likely to disown his own child and is particular as to how it behaves in public.

I do not want to convey the impression that all is smooth sailing for industry toward the port of self-government on the sea of NRA. Strange and variable winds from other quarters are continually ruffling the surface and the industrial navigators are continually dodging thunder bolts and water spouts.

The great trouble is that no barometer can predict the weather a day in advance, hence no navigator

Condensed from an address made before the representatives of 34 agricultural cooperative associations, July 13, at the American Institute of Cooperation, University of Wisconsin, Madison, Wis.

THE restoration of the durable goods industries means the restoration to full buying power of 25,000,000 former buyers of farm products who are now existing on subsistence levels."

"Agriculture must make real profits in its own right to make it a good long-term customer for industry exactly as industry must do to make it a good long-term customer for agriculture. Neither one, on Government dole or subsidy, is in sound position to contribute to the other's prosperity."

"Regimentation, under bureaucratic control, is the antithesis of self-government through cooperation. The schoolboy does not cooperate; he obeys the professor."

"Today, our problems are common problems. We should renew our kinship in behalf and defense of economic self-government through cooperation."

can plan his course. Even the pole star is shifted from time to time without notice. These perplexing shifts, it is only fair to say, do not proceed from NRA but from other quarters. The strongest wind is the prevailing one for the day, whether it comes from Congress, the Federal Trade Commission or some other extraneous quarter.

Speaking of self-government in industry or in agriculture is a matter of relativity. There has never been complete self-government and there never will be. The part must be regulated in conformity to the whole. The question is, how much government regulation is necessary and wise.

In the face of widespread unemployment, it was clearly recognized that self-government could not extend, as yet, to the assignment of the number of hours in the working week or to the minimum wages to be paid to workers. There were two reasons for this. First, industry was not organized to handle it; second, it was not equipped, under its own powers, to handle the chiseler. Government

regulation was recognized as necessary in these instances.

Regulation by Horizontal Edict

Government regulation by horizontal edict in the matter of working hours per week, while admitted as necessary in the emergency, is not a scientific or satisfactory long-term solution to the unemployment problem. Already, for example, there are serious shortages of labor developing in certain skilled occupations, while in other occupations there is a considerable surplus. It does the public interest no good to deprive a skilled man of additional working hours when there is no one to take his place. When we have progressed somewhat further along the road of self-government in industry we should find the assignment of working hours to be a part of industry's problem of assuming responsibility for the spread of employment to its employable. This, too, is in the direction of solving the problem of technological unemployment, whereas the mere horizontal Governmental restriction of working hours is not.

Of all of the codified industries, I can think of none that has gone further on the road to self-regulation during the past year than has the steel industry. Its code is astonishingly complete even to the regulation of details of trade practice. As to results relative to the intent of the Recovery Act, there is no industry that can show a better performance. Employment has been increased to approximately the 1929 level, wage rates have been increased to the extent of 7 per cent above 1929 level and prices are $7\frac{1}{2}$ per cent lower than the 1929 level, as measured by THE IRON AGE composite for finished steel. Its 400,000 workers are well satisfied, in spite of the representations of professional labor leaders to whom satisfied labor spells merely a prospective loss of "gate receipts." The one "fly in the ointment" is that very few steel companies are making any money, but at least most of them have stopped losing it, and that, today, is indeed a source of optimism.

Self-Government in Basic Industries

One of the reasons why self-government has apparently made such good progress in the steel industry should be of interest to agriculture. Steel, like agriculture, is a basic or primary industry. It is but one step away from the soil. Such industries offer more opportunity, or perhaps less difficulty, of self-regulation than do the industries that are two or more steps removed from the basic strata. For

one reason, there is less complexity of product in these basic industries and a higher degree of common interest among their members. The experience of steel, coal, lumber and other basic industries under the aegis of NRA makes one wonder if the same principles of self-regulation would not work to similar advantage in agriculture.

This applies very forcibly to the matter of price control, whether it be by absolute price-fixing, open price arrangement or simply the prohibition of selling below cost. Whether one approves or disapproves of any or all of these methods of price control he must admit that feasibility of price control is a maximum with the basic commodities and this feasibility diminishes rapidly as you encounter the more diversified and less standardized products in industries two or more steps removed from the basic commodities. It is quite feasible, for example, to establish uniform prices on steel but it would not be at all feasible to establish uniform prices on motor cars or fancy dress costumes.

Beneficial Price Stabilization

The self-regulation of price in the steel industry, through the open price association with its complete price publicity has eliminated the chiseler and enabled the small consumer to obtain his steel at exactly the same price that his large competitor pays. It has taken the steel selling game out of the Armenian lace-peddler classification and has put it on a business basis. From the standpoint of the producer, or employer, this possibility of eliminating suicidal price cutting has been the big code accomplishment; the one big thing that he has gotten out of it that makes it worth what it has cost. If this privilege of exercising some practical form of competitive price stabilization were to be removed the game would not be worth the candle.

NRA's Relation to Agriculture

Thus far I have been looking at NRA from the industrial viewpoint. Now I would like to dwell for a few moments on what industry's experience of the past year means to the farmer.

One year ago the general index of all commodities excepting farm and food products stood at 70.1 and the index of farm products at 56.9. Today, or at the last reported week, the commodity price index was 78.5 and the index of farm products was 64.8. In other words, since the recovery movement was initiated, manufactured commodity prices moved up, as

a whole, 11.9 per cent and farm prices, as a whole, moved up 13.8 per cent. Since the buying power of the farmer income is measured in terms of the selling price of manufactured goods, this showing means that, on the whole, the NRA has helped the farmer and not hurt him. Of course, averages are deceptive, and there are, no doubt, specific cases where the reverse is true.

There is another beneficial angle to NRA as it affects agriculture, and that is in the fact that industrial workers form a large part of the market for what the farmer has to sell. The increased wages paid in industry under NRA have also helped the farmer; also the fact that some 4,000,000 additional workers have been put in a position to earn wages and buy farm and food products.

Most of the codified industries feel that their experience under NRA is such as to warrant their support of its principles, at least for some time to come. It would seem as if agriculture, because of its indirect benefits from NRA, should have a similar interest.

Industry and agriculture are, in fact, so closely allied in interest in many current matters that a closer cooperation between them would be beneficial to both. Certainly the enlightened men of industry recognize their own interest in having prosperous farmers for customers.

What Capital Goods Prosperity Means to Agriculture

One situation that seriously affects the farmer, for example, is that of the capital goods industries. As you are aware, the consumer goods industries, in employment and wages, are rapidly approaching normal, whereas the capital goods industries are still very much depressed. Practically all of the remaining unemployment of close to 10,000,000 workers is either in the capital goods industries or in the related industries and services dependent upon them.

One might say that the farmer had no particular stake in the capital goods industries' welfare, aside from the minority of well-to-do farmers who have invested in stocks or bonds of such companies. That is quite untrue. The 10,000,000 unemployed wage earners and their dependents, who are without income because of the depressed state of the capital goods industries, represent, conservatively, with their dependents, 25,000,000 food consumers or farmer-product customers who are living either on charity or on carefully conserved savings and on a minimum subsistence level.

It is certainly to the advantage of agriculture, as it is of industry, to help remove the obstacles which keep these 25,000,000 from being good customers.

Greatest Obstacle to Mutual Recovery

What are these obstacles which the farmer, with his great political influence, can effectively help to remove? The greatest obstacle is the present reluctance of private capital to invest money in private enterprise. The amount of funds flowing into securities which normally provide capital for the capital goods industries has shrunk from a 10-year average from 1921 to 1930 of \$4,000,000,000 a year to a present average of but \$160,000,000 per year in 1933. A 96 per cent reduction. This was clearly revealed by the recent report of the Durable Goods Committee to the President. The committee, consisting of eminent industrialists appointed by the Administration to study and report on the capital goods situation, cited the following conditions as requisite to the recovery of the capital goods industries and the consequent reemployment of the remaining large number of unemployed:

- (a) A free flow of private capital into private business.
- (b) A sound real estate mortgage business.
- (c) Industrial relations on a basis which will assure cooperation instead of strife.
- (d) A balanced price parity between agricultural commodities and manufactured goods.
- (e) The further reestablishment of confidence—most important of all.

As essential to the establishment of confidence, the committee cited the following:

- (a) Assurance to private enterprise that the profit incentive will continue to receive public approval as an energizing motive for economic activity.
- (b) Public recognition that the only legitimate purpose of taxation is to provide the necessary revenue for government and not to effect a punitive redistribution of wealth which paralyzes business initiative or for any other purpose.
- (c) Removal through a permanent balancing of the budget of the threat of uncontrolled inflation.
- (d) Removal of any remaining threat of a sudden and arbitrary change in our monetary policies.
- (e) Assurance that companies which have adjusted their business methods and policies to the temporary emergency program of NRA will be free from the uncertainties of unreasonable or arbitrary administration.
- (f) Clarification of the Government's policies toward measures and trends which are inconsistent with our economic system.

Restoring 25,000,000 Farm Customers

The work of this committee is not merely in behalf of the industries that



JOHN H. VAN DEVENTER
Editor, The Iron Age

its report has covered, nor in behalf of the unemployed in those industries. It is attempting something that is of great interest to agriculture, indeed of vital interest to you in these days of agricultural surpluses. It is trying to find the way to restore full buying power to 25,000,000 of your former customers so that they may buy more wheat, more cotton, more meat, more dairy products. Do you suppose that these unfortunates now buy oranges or grape fruit or new cotton sheets or pillow cases or any of the hundreds of farm products that they must in their poverty now unwillingly consider as dispensables? Think what a tremendous stimulus to agricultural-product consumption would follow the restoration to earning and spending power of the unemployed workers in the capital goods industries who represent this great market.

This is your problem as much as it is industry's problem. I say to you that it would be a great public service to agriculture if the cooperatives of this country represented here in such impressive membership would study carefully this report of the Durable Goods Committee, comes to a conclusion as to the soundness of its

facts and its recommendations and then officially express this conclusion to the President, to the National Recovery Administration and to your Congressional representatives.

Mutuality of Interests

This illustration of mutuality of interest between agriculture and industry that I have cited is but one of many. It could be multiplied many fold.

Have you reflected, for instance, what the determined effort to "close shop" American industry and turn it over to union labor, with its seniority rules and its restrictions of output, will cost the farmer if it should be successful? If not, it may be illuminating to figure what proportion of your return for a bushel of wheat must be paid for freight today as compared with the proportion paid for it before the war-time capitulation to the railway brotherhoods.

You may imagine that agriculture is immune from the effects of such legislative measures as the Wagner bill or the Black 30-hour bill, because there has been no drive undertaken as yet to unionize farm labor as there has been industrial labor. But you are not immune. If these measures eventuate, you will help to pay the piper willy-nilly, for it is the contents of the farm working hour that you exchange for the contents of the industrial working hour in selling and buying—not dollars.

Necessities for Long-Term Prosperity

Industry, in turn, may imagine that it has no immediate interest in what happens to the farmer under AAA, except in so far as it may enlarge or curtail the farmer's buying power for the purchase of manufactured goods. But that is not true, as the best minds of industry already well know. Agriculture must make real profits in its own right to make a good long-term customer for industry, exactly as industry must do to be a good long-term customer for agriculture. Neither one, on Government dole or subsidy, however generous or large, is in a position to contribute soundly to the other's prosperity.

Agriculture has a job of self-interpretation to do to industry and industry has one to do to agriculture.

Industry would give a great deal to know whether the objective of self-government through cooperative effort, as promised by NRA, will be sustained by higher authorities, or overthrown by them. I should think that agriculture would want to know the answer to this question, too.

(Concluded on Page 78)

How Attractive Finish Helps

By ARTHUR B. TICKLE, Jr.,

If a metal part wears down in service it is possible to build it up by applying a new coating of metal with a spray pistol. In a similar way, coatings of a hard metal may be successfully applied to a soft metal on production work. Or a metal subject to corrosion may be coated with zinc, cadmium, or aluminum, so that it will resist corrosion under different conditions. This process of

metal spraying is relatively new in this country, and the possibilities of the method as a fabricating means in industry are just becoming apparent

This series is being prepared under the direction of Mr. Simonds for *The Iron Age*. Mr. Tickle is in charge of metal spraying at the Arthur Tickle Engineering Works, Inc.

If molten metal is blown, under proper conditions, onto a solid metal surface it will adhere to that surface with a tenacity which, for many purposes, is as satisfactory as if it were actually part of the surface metal. This fact is the basis of a recent development in metal finishing known as metal spraying and apparently destined to become an important industrial process.

Powder spraying, or the atomizing of metals for decorative purposes such as gilding, is a very old art—older in fact than the Christian era—but in that art the tiny particles used invariably were made from the solid metal. The modern sprayed molten metal coating process, which M. U. Schoop, a Swiss engineer, is given credit for originating, may be described as follows: Metal in the form of wire is fed automatically into an oxygas flame where it is melted. The thin stream of molten metal is broken up into a finely divided condition by means of a powerful jet of compressed air, and finally carried or projected onto a prepared metal surface.

During this operation, metal is transformed from wire into a sheet of metal which, in many applications, as mentioned, may be considered an integral part of the base metal. The

metal thus applied is made up of a multiplicity of semi-molten or plastic particles, which are flattened out by impact and interlocked first with the base metal and subsequently with each other.

The apparatus for processing is an ingenious instrument called a spraying pistol which uses oxy-acetylene, oxy-hydrogen, or oxygen and city gas for melting the wire. In the experience of The Arthur Tickle Engineering Works, Inc., Brooklyn, which

probably is the chief exponent of the sprayed metal process in this country, the wire ranges in size from No. 13 to No. 20 B. & S. gage and is pushed into the nozzle of the pistol at a uniform rate so that, as the end of the wire is melted and atomized, the position of the end with respect to the flame remains unchanged. The best size of wire to use has been determined by careful tests, and varies for the different metals sprayed. Different sized tips are used to correspond to the different wire sizes.

The process of metal spraying at present is most extensively used in building up worn parts such as crank shaft bearings, valve stems, and guide rods. One of the routine jobs handled at the Tickle plant is the building up of plating press cylinders, and a description of this more or less standardized process will serve to explain the nature of metal spraying. The cylinders are 36 in. long and 13 in. in diameter, made of a fine grain gray iron casting with no blowholes. These cylinders develop hollows in service. This is possibly due to cor-



Fig. 1—The metal spraying pistol may be mounted on the tool rest of an ordinary lathe. Revolutions of work about twenty per minute. Feed about 1/32 in.

Metal Products Sales

22—Coating with Sprayed Metal

rosion from the acid cleaner used to remove ink. The job in repairing such a cylinder is two-fold, first, to build it up to the original diameter of 13 in., and second, to apply a coating of stainless steel which will protect it against subsequent corrosion of a similar character.

The cylinders, after reaching the Tickle plant, are first calibered and then turned down to a uniform diameter. They are then sand blasted and placed in the spray machine for coating. The spray machine is essentially a lathe with two or more spray pistol attachments mounted on the tool slides. If two spray pistols are used, one is placed at the end of the cylinder and the other at the center, and the feed is then arranged so that the entire surface is covered by moving both pistols through half the length of the cylinder.

The pistols are so set that the point where the wire melts is about 5 in.

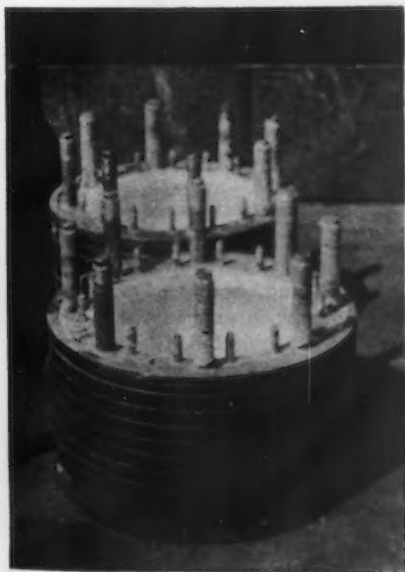


Fig. 2—Interiors of Diesel engine pistons are coated with aluminum and zinc as protection against temperature and corrosion.

from the surface of the cylinder. The cylinder itself is revolved at approximately 20 r.p.m., and the feed of the pistols across the surface is about 1/32 in. per revolution. By this means a uniform layer of stainless steel, to the depth of 1/32 in., will be applied in about 8 hr.

What Happens in Spraying

Comparatively little is known about the microscopic structure of the coating applied by spraying. When

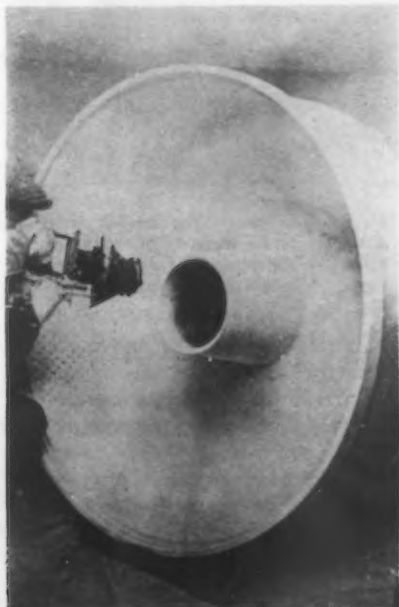


Fig. 3—Irregular containers used in the food industry are easily coated with protective metal by spraying.

the tiny molten metal particles are hurled through the air at great force, they come to rest as they splash against the rough metal surface, and in so doing they flatten out and interlock with the surface irregularities and with each other. Each tiny particle is flattened into a microscopically thin scale, and when it is realized that the structure of the sprayed coating

consists of mechanically interlocked scales, it becomes obvious that there will be a loss of tensile strength and a gain in porosity as compared with the original solid metal of the wire.

Despite this, a properly applied sprayed coating will exhibit some remarkable qualities. Valve stems used in marine engines are repaired after



Fig. 4—After a little practice an operator is able to apply metal to tanks about as simply as he would spray paint.

packing wear by spraying high carbon steel on the worn mild steel shaft, and these repaired shafts have never been known to wear down again, although the work has been going on for several years. It is the opinion of the Tickle company that the sprayed coating of high carbon steel is of such a nature as to better resist wear in this particular service than would an ordinary rolled steel shaft with a case equal in hardness to that of the sprayed metal coating. The theory is that the slightly porous nature of the sprayed coating becomes self-lubricating after oil has been applied, because the oil sinks deep into the pores of the coating.

The individual particles of the sprayed coating must be exceedingly

minute because they do not interfere with accurate grinding and polishing. Printing press cylinders, after spray surfacing, are ground to a tolerance within 0.0002 in.

Technique of Spraying

The preparation of the surface to be sprayed is of great importance. It determines in a large measure the degree of adherence of the coating. A good method is to blast the surface with steel shot at high pressure. This cleans and roughens the surface and leaves small elevations and depressions, or keys. In actual practice the Tickle company never allows an uncoated surface to remain more than 1 hr. without applying metal. This eliminates any chance of oxidation of the surface, or the gathering of moisture or dust on the surface.

Every effort should be made to control the melting of the wire evenly to obtain a fine grain metal structure. This is important for two reasons. First, if the metal is lumpy or not uniform in its application, the tiny particles will be too large to fit the crevices made by blasting the base metal surface, and an insecure bond will be the result. Second, the applied metal will not have adequate density and will therefore permit access of moisture. Also, the metal structure will be weak or "powdery." It must be remembered that the mechanical bond of the process depends upon a properly roughened surface, and upon a properly melted and atomized sprayed metal coating.

A wide range of metals may be successfully applied by spraying, among which are high carbon steel, aluminum, lead, zinc, tin, copper, bronze, brass, nickel, monel, stainless steel, silver, gold, molybdenum, tantalum, and nichrome. In fact any metal can be sprayed that can be obtained in wire form and that has a melting point within the range of the heating mechanism of the pistol.

One of the variables in spraying which must be watched carefully is the distance from the pistol to the work. About five inches is the usual distance. Other variables are:

1. Speed of work in r.p.m.
2. Feed or travel of pistols.
3. Air pressure.
4. Temperature.

Spraying Pistols

A diagrammatic cross-section of a typical American spraying pistol is shown in an accompanying illustration. The nozzle may be considered as consisting of three concentric tubes. The wire to be sprayed is advanced through the central one, the gaseous

mixture (acetylene with oxygen) through the next, and the compressed air through the third or outer annular space. The gaseous mixture, burning at the orifice, melts the wire in the inner part of the conical flame, and the compressed air accomplishes the atomizing and spraying of the metal as it is melted.

A wire feed mechanism in the pistol is employed to draw the wire from a coil and feed it through the oxy-acetylene flame where it is melted as



Fig. 5—This shows the English type of pistol. It uses a reservoir of molten metal while the American type uses a wire fed into a melting frame.

fast as it emerges. The driving mechanism for feeding the wire is a small air turbine driven by the compressed air used for spraying the metal. The oxygen and acetylene pressures range from 14 to 28 lb. The compressed air pressure ranges from 40 to 60 lb.

The English method is somewhat different from that described above, as the following quotation from Mel-lowes & Co., Ltd., Sheffield, will indicate: "All metal work must be sand-blasted before spraying, to remove any rust or scale, and to provide a suitable surface to which the metal spray can adhere. With other materials it is only necessary for the surface to be dry and free from grease.

"The metal to be sprayed is first melted in a small gas heated crucible, from which the container of the pistol is filled about every 20 min. A Bunsen type flame under the container, the gas for which is obtained by

connecting the pistol to the ordinary gas mains by means of a rubber hose, keeps the metal in a molten condition while spraying. The pistol is also connected by a rubber hose to a compressed air supply of 60 to 75 lb. per sq. in., and when the molten metal flows to the nozzle it meets the pre-heated compressed air, which very finely atomizes it, so that the minute particles of metal are blown against the surface to be covered at a tremendous velocity and adhere firmly, forming a continuous metallic coating with a fine matte finish.

"The thickness of this coating is approximately 0.004 in. and the speed of application 8 to 10 sq. ft. per min., but this coating can be increased to any desired thickness by allowing the pistol to travel at a slower rate across the surface to be sprayed."

A special type of pistol has been developed in America for coating the inside of long tubes and pipes with soft metals. This pistol has a tiny revolving nozzle at its tip, which throws the metal particles laterally against the walls of the pipe. With this special pistol, pipes 1-1/4 in. inside diameter and 14 ft. long have been spray coated.

Applications

A description of a few actual metal spraying jobs, as performed at the plant of the Tickle company, will serve to illustrate some of the practical details of the process. Two Medart rolls, one approximately 8 in. in diameter and 12 in. long, and the other, an hour glass, 8 in. at the largest diameter and 12 in. long, were successfully repaired. These rolls are used for straightening brass and bronze rounds 2 in. in diameter. The bronze bars, after extrusion, are pushed through the rolls which polish and straighten them for finished stock. The rolls are subjected to terrific wear and heavy pressure at the same time.

When these rolls were received for coating, they were worn about 1/16 in. They were built up with high carbon steel and ground to original size, and are now in service where the new coating is expected to show better wearing qualities than the base metal.

A tail shaft for a yacht, 18 ft. long and 6 in. in diameter, with two bronze bearings, was received for repair. Between the two bearings the steel shaft was badly pitted and corroded. Adjacent to the bearings on the steel shaft, the condition of the shaft was particularly bad. The stern gland liner was worn. It was repaired as follows:

The two low, badly corroded areas

adjacent to the bronze areas were filled in with low carbon iron, bringing the shaft back to size. The steel shaft, for a distance of 8 ft. between the two bearings, was then sprayed with cadmium to resist salt water corrosion and the reoccurrence of this condition. The tail end bearing was built up with phosphor bronze and turned to original size. This job was done at a great saving in time and expense, with the repaired shaft better than a new one.

A closing machine valve and seat, which are the main parts of a vacuum pack machine, were worn and were giving inefficient service. The valve was 21 in. in diameter with a 12-in. face. It was built up with high carbon steel and ground to size. The seat had developed several low areas. These areas were filled in separately with an alloy metal and machined to suit the temperature of the valve. The machine is now running with the efficiency of a new machine, at a saving of 50 per cent.

In the automobile industry many parts are reclaimed to advantage by metal spraying. Crank shafts are built up on the journals and ground to original size. Rear axles and king pins are similarly prepared, using a hard wearing metal for spraying. Leaky cylinder blocks may be filled in with an alloy metal where hair line cracks develop between the valve seat and the cylinder. Wear resistant metal, such as an alloy steel, has been successfully used to coat brake drum lining faces.

Another application that is gaining favor in repair of automobiles is the spraying of aluminum in the combustion chambers of high pressure motors. This retards carbon and aids complete combustion of the gasoline. A recent development of applying high speed babbitt for bearings bids fair to be of importance in industry. A thickness of 1/64 in. to 1/16 in. may be applied, and such a coating is used in cases where it was only practical to use bronze in the past. Apparently babbitt, when sprayed, is free from blowholes or defects in the finished layer, and the bond, when the base metal is prepared by blasting, is better than in most cases where the babbitt is poured hot into place.

Another valuable feature of the spray-applied babbitt is the control of the composition. Not only may coatings of the purest metals be applied, but two metals may be applied simultaneously or successively by merely altering the mechanical features of the spray pistol. A combination of zinc and aluminum has

been found excellent for resisting the corrosive attack of atmospheres high in sulphur dioxide.

An example of the practical application of aluminum to iron is illustrated by the coating of a drum used for extracting caffeine from coffee. The drum in question is 6 ft. in diameter and 21 ft. long, and is subject to great changes in temperature in use, and also to the action of solvents used in the process. As originally made, the drum had a coating of enamel on the interior, but constant expanding and contracting un-



Fig. 6—Storage tanks in the chemical industry are spray coated with aluminum.

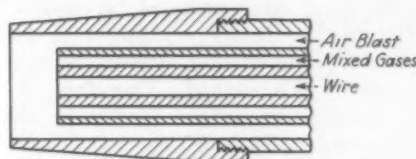


Fig. 7—This is a section through the nozzle of the American type spray pistol. There are three concentric spaces, one for the wire, one for the melting gases, and one for the air blast.

der temperature changes caused this to chip off. The aluminum as applied is 0.015 in. thick, and not only has it been successful as a protective layer, but it was found that the flavor of the coffee has been improved.

Some Advantages

Since no preheating is done during the spray coating of a part, some objectionable features of welding are eliminated. It is unnecessary to dismantle equipment in order to facilitate a repair by spray coating. The worn or mis-machined sections can be treated without interfering in any way with the rest of the equipment. After the coatings are applied they may be used in their unfinished state, which is a matte or sanded surface. They can be filed, ground or polished just the same as ordinary metals.

To sum up, any metal can be applied to the same metal or to any other commercial metal, and to any base surfaces such as wood, plaster, stone, glass, concrete, rubber or molded compositions.

Sprayed metal coatings may be used in many cases for protecting ferrous metals against corrosion, but the process is not as simple as just applying any non-corroding metal to steel. The electro-chemical theory of corrosion must be followed through closely in the application of sprayed metal for protection. Zinc is anodic towards iron and close in the electro-chemical series. Under corrosive conditions a natural protective coating of zinc compound (hydrocarbonates and oxychlorides) forms and adds materially to the life of the zinc.

A sprayed coating of zinc for atmospheric corrosion is thought to be superior to zinc coatings applied by other methods. Zinc can be applied thicker and there are no fluxes or traces of acid present at the base. It has been shown in many cases that as a protective coating cadmium possesses distinct advantages over zinc. Cadmium stands closer to iron in the electro-chemical series and will not, therefore, deteriorate so quickly as zinc on account of anodic attack. It protects like zinc in accordance with well-established electro-chemical principles, and is far more resistant to the attack by acids and chlorides.

One of the most practical and economical methods of producing a protective coating of aluminum on steel is by metal spraying. Aluminum is anodic to iron and resistant to much chemical action. For the protection of steel, which is exposed to high temperatures, sprayed aluminum has been found to:

1. Retard oxidation.
2. Prevent clinkers from adhering to surface.
3. Increase the life of the object from four to ten times.

In extreme cases a heat treatment is applied to the coated piece, the aluminum thereby penetrating to a considerable depth, and consequently raising the resistance to a still higher temperature range.

Governmental tinkering with the industrial structure, experimental regulation, attempted regimentation and other artificial restrictions and handicaps imposed upon industry are discussed in a booklet issued by the Farrel-Birmingham Co., Ansonia, Conn., as No. 7 in a series devoted to discussions of economic and business topics of current interest.

New Methods of Extrusion

NEARLY a quarter of a million tons of lead are required each year in this country for cable and electric conductor covering, and practically all of this heavy tonnage is applied by extrusion. Therefore, any improvement in the art of extrusion assumes widespread importance. Starting with this hypothesis, W. L. Sherman of John Robertson Co., Brooklyn, recently began an exhaustive investigation of the subject in an attempt to improve not only dies and equipment, but principally to improve the quality of extruded lead products.

If you place a chunk of lead in a cylinder and then apply sufficient pressure to squeeze the lead out through an opening, you will have an extruded product in its crudest form. The nature of such a product will depend upon a large number of variables, of which the following are a few of the most important:

1. Design of dies through which the metal is extruded.
2. Design of cylinder contour.
3. Pressure.

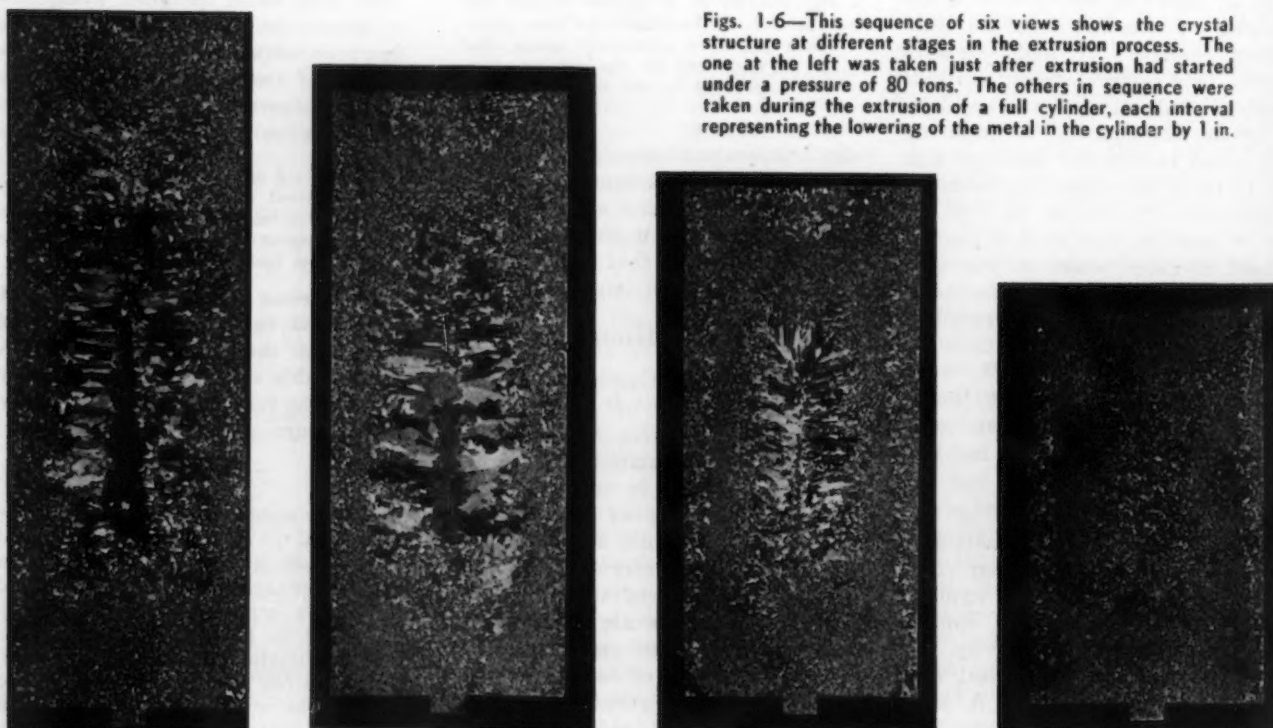
By HERBERT R. SIMONDS

4. Temperature of metal at time of extrusion.
5. Bond between the metal and the walls of cylinder.

Two processes of extrusion for lead are in general use today. These are called the poured-in process and the slug process. The poured-in process results in a closer bond between the metal and the walls of the cylinder and therefore under pressure there is more "working" of the metal before it reaches the extruded form. This process develops products of much better quality than the other process, but is somewhat more expensive. In the slug process, billets of lead are placed in the press in solid form and extruded promptly. For most ordinary equipment it is possible to practically double the capacity by this method. Therefore, it is widely used where quality is of secondary importance, as is the case

when a lead tube is used as a mold for making rubber hose such as garden hose. In this case the rubber products are vulcanized in the lead covering, and the lead is subsequently stripped off and remelted for repeated use. Other products extruded by this slug process are solder wire and shapes and strips used for gaskets and for decorative molding.

Inasmuch as Mr. Sherman's work was designed primarily to improve the quality of the extruded product, it was carried on almost entirely in connection with the poured-in process. A test cylinder about 2½ in. in diameter and 8 in. long was designed so that the billet could be readily removed at any point of the process. This cylinder was preheated to 220 deg. Fahr. at the start, and decreased to 202 deg. Fahr. at the time the last slug was removed for photographing. The lead used was new pig of Omaha and Grant, and this was melted in a small pot and then poured into the test cylinder. No lubricant was used, and a setting pressure of 25 tons was applied for a period of 6 min.



Figs. 1-6—This sequence of six views shows the crystal structure at different stages in the extrusion process. The one at the left was taken just after extrusion had started under a pressure of 80 tons. The others in sequence were taken during the extrusion of a full cylinder, each interval representing the lowering of the metal in the cylinder by 1 in.

Improve Lead Sheath

After this the pressure was increased to 80 tons, when extrusion started. The first slug was then removed, cut longitudinally, then etched and photographed, and the crystal structure shown in Fig. 1 was the result.

Studying Grain Structure

The second slug was made by repeating the process, that is, by pouring lead into the test cylinder up to the same height as for the first photograph, applying the 25 tons setting pressure for a period of 6 min., and then again increasing this pressure to about 80 tons to cause extrusion. Extrusion was continued until the piston applying the pressure in the cylinder had moved down 2 in. In other words, the second slug was removed after extrusion had continued until 2 in. of the metal in the cylinder had been used up. The second slug was then removed and photographed in the same way as was the first.

This process was continued until the height of the metal remaining in the cylinder had been reduced by 6 in. The successive photographs show the different stages. It will be noted that the metal tends to cling to the side of the cylinder, thus forcing the center portion down into the dies first. The grain structure at the base of the slug keeps improving as the working of the metal breaks up the larger crystals, and finally, in Fig. 6, a homogeneous close-grained product is secured.

The reason that tests were made without the use of any lubrication is due to the fact that this is the desired practice because the introduction of a lubricant frequently causes dirt streaks, especially at the time of re-filling when it is particularly desirable to have the surface of the old metal in the cylinder as clean as possible. By studying the photographs it was possible to follow the movement of the metal through the various sections of the dies, and, from this, to redesign the dies for better metal working conditions and therefore better grain structure. As an example, a die with a sharp recess has a tendency to hold metal stationary in such recess, with the result that the dies are never thoroughly clean of old metal.

In the process of coating cable, die design is of particular importance because the metal separates to surround the cable and meets again on the opposite side, giving cause for a weak point at the junction. This weak point can be overcome by using the proper design of die and being sure to keep the metal absolutely clean. In an attempt to correct any possibility of separation and joining of the inflowing metal, some designers deviated sharply from the type of die block shown in Fig. 7, and completely surrounded the core tube with a comparatively thin section of metal previous to extrusion. This type of die, while overcoming some of the difficulties, developed new ones, and

THE extrusion of metals is by no means a new art. A Scotch firm sent an extrusion press to a firm in Pennsylvania before the Civil War, and the same press (with some new parts) is in operation today. However, the possibilities of extrusion, as a means of fabricating, have been glimpsed but recently, and many companies are now producing or planning to produce shapes and forms thought impossible to make by extrusion even as late as 1925. The accompanying article describes some of the research work now being done in this interesting field under the direction of W. L. Sherman.

its use has therefore been somewhat limited.

Design of Dies

Fig. 7 illustrates the basic principle of applying lead sheath to cable. Here the die block consists of a core tube and ring-shaped die, both mounted in a hollowed-out block. These leave an adjustable opening between the core tube and the die, which furnishes a means for controlling the thickness and diameter of the sheath. The entire block assembly is placed underneath a large cylinder for receiving molten lead, and both are then placed in a hydraulic press.

John R. Shea, of the Western Electric Co., in describing the method of coating cable for the Bell Telephone System, says: "The latest type of press used at Baltimore is known as the 34-in. inverted press. Its stroke is 56 in. and the diameter of the ram is 10½ in., giving a lead alloy capacity of 1800 lb. per charge, and a maximum extrusion rate of 5680 lb. per hr." Presses of this type, which are shown in Fig. 8, are 21 ft. in height above the floor-line, and have the water cylinder mounted between the four columns at the top of the press. The water ram, which is 34 in. in diameter, is bolted direct to the lead ram, which is 10½ in. in diameter, and in this way when hydraulic pressure is applied to the water cylinder, it gives a correspondingly greater pressure to the lead cylinder.

In actual practice, water at 5500 lb. per sq. in. is used, which exerts a pressure of approximately 59,000 lb. per sq. in. on the lead. The machines are ruggedly built, and the dies and other parts are stationary, facilitating handling of the cable and insuring that the cable core always enters



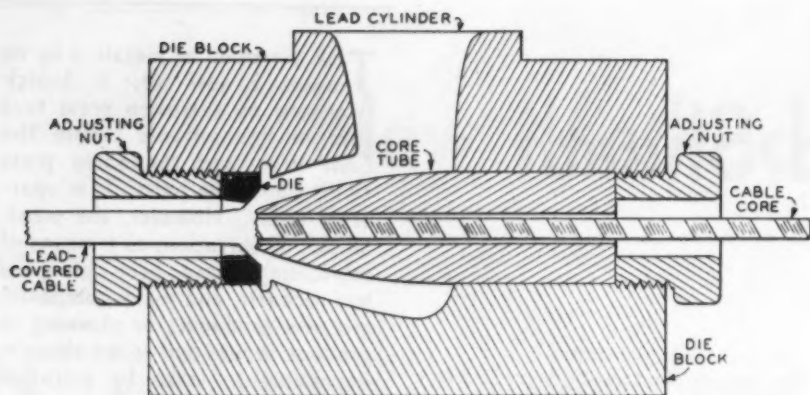


Fig. 7—The die block used for lead coating cable is designed to protect the cable from the lead.

and leaves the die block at the same angle. Concentricity of the sheath is one of the important considerations, and not only is rugged construction important for this, but uniform application of heat is also a factor. If one part of the sheath as it is applied is warmer than another part, the uniform pressure will produce an eccentric wall.

Another factor is speed of extrusion, which is usually controlled by a trained operator. Indicating instruments are used to show not only temperatures at various parts of the die block, but temperature of the molten lead and of the cylinder itself. Temperatures at different points are automatically controlled. As the lead covered cable leaves the press it is wound either on wood or steel reels, depending upon its type. A full reel may weigh as much as 10,000 lb., and in the modern type of machine, such a reel when full, is automatically

ejected by means of a small hydraulic cylinder.

One important feature in extrusion of lead is the introduction of the new molten metal into the cylinder. Formerly, such lead was delivered in skids by an overhead traveling crane. The new arrangement, as described by Mr. Shea, consists of melting the lead alloy in a large furnace at a central location, and distributing this molten lead through a long-loop pipeline running back of the presses. This line returns to the furnace in a closed circuit. The line itself is electrically heated and the lead is kept in constant circulation.

In order to take full advantage of such a system, the presses were placed close together, as indicated in Fig. 8. The central furnace, or heating unit, consists of three oil-heated kettles, the middle kettle being used for melting and preparing the alloy. One of the outside kettles is used as a

main supply connected to the distributing system, and the other is a spare which may be cut into service to replace either of the others. Each kettle has a capacity of 120,000 lb. of lead, and the melting capacity of the system is 80,000 lb. per hr. Charging of the metal kettle is by means of a special cable which introduces 100 billets of standard size at a charge. The antimony is introduced in a separate chamber below the surface of the lead.

A Pipe Line for Lead

The main-line piping system is made of seamless steel tubing supported on a roller-conveyor system to take care of the expansion and contraction which amounts to 6½ in. per 100 linear ft. at 750 deg. Fahr., or a total of approximately 20 in. under normal working conditions for the system. The down spouts are of seamless steel tubing and have a steel valve at each joint with the main line and a service valve at one corner of the "U" bend. All joints are oxy-acetylene welded, and no fittings are used throughout the system. The lines are insulated with pipe covering protected by a layer of fireproofed canvas.

They are heated initially by a series of transformers which supply a low-tension, high-amperage current directly into the pipe by forming a loop of the supply and return line. Once circulation of the lead has been established in the piping system, the main line requires little additional heat from the transformers, as the

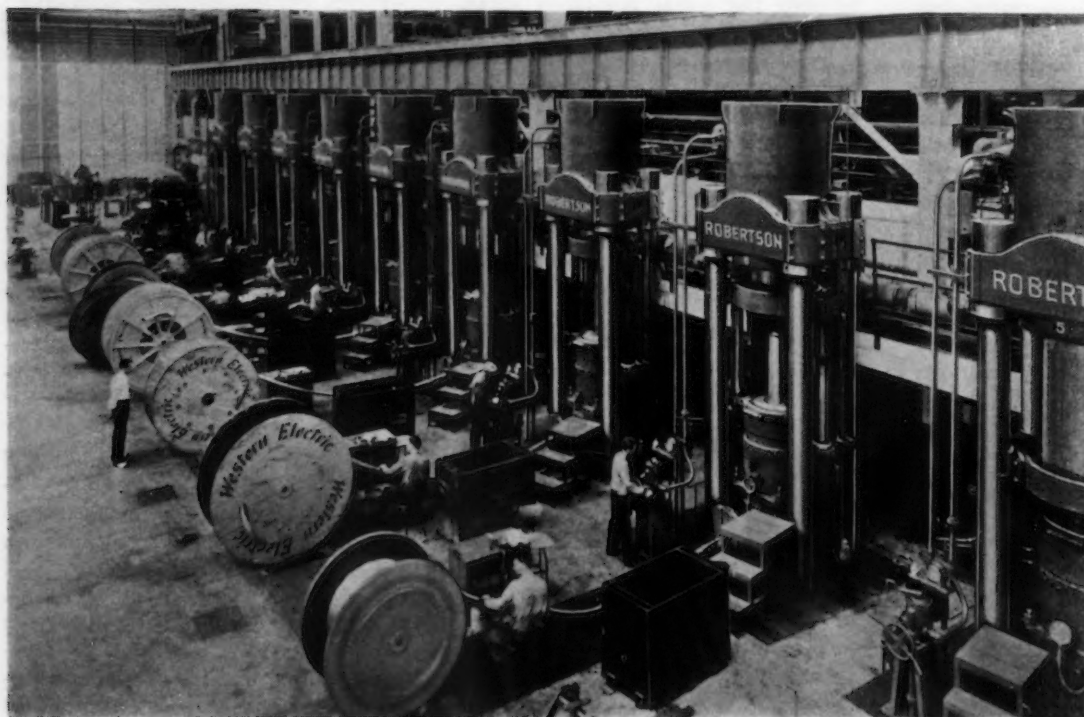


Fig. 8—In a plant in Baltimore a battery of modern extrusion machines cover cable with lead alloy at the rate of 56,800 lb. of the alloy applied per hr.

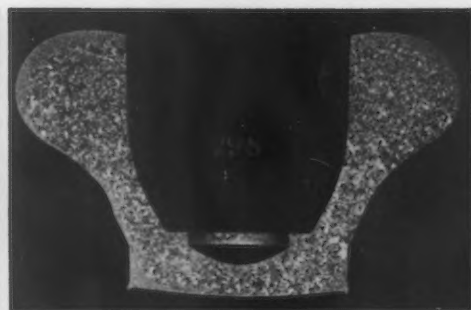
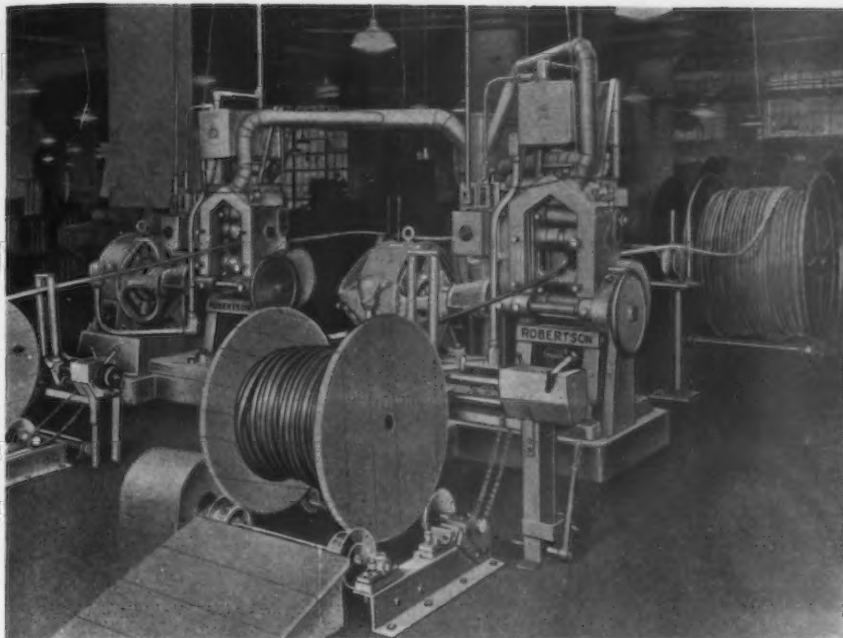


Fig. 10—This shows a section through the die block. The bond between the moving metal and the wall of the die is apparent.

Fig. 9—In manufacturing garden hose, the rubber is first vulcanized in a lead sheath and the lead is then automatically stripped on the machines shown, for re-melting and further use.

flow of the lead will ordinarily keep the line up to temperature. Approximately 4 kva. are required on each down spout while in use.

This system has been in operation for about nine months and has resulted in a higher quality of lead sheath due to more uniform composition maintained. In addition there are considerable savings in fuel, reduction in dross, and elimination of a large amount of heavy manual effort. The press room is now clean and cool, resulting in much better working conditions and in turn an indirect improvement in the quality of the product.

Automatic Reel Control

One of the difficulties in most of the extrusion processes now in practical use is the necessity for interrupting the operation at regular intervals in order to recharge the cylinder. Various methods for continuous operation have been tried, including a multiple cylinder press in which one cylinder would be filled while another was in operation. Another method was an attempt to use the screw principle to exert a continuous pressure, pouring the molten metal in at one point, holding it under pressure for part of its travel, and then having it extruded at a further stage. All of these methods have been discarded for the single-cylinder poured-in process which at present gives the best results. Presses for this method are out of production a good part of the time, and it is therefore usually necessary to provide duplicate presses in order to meet a stated total production with greatest efficiency.

As the lead sheath comes out of the

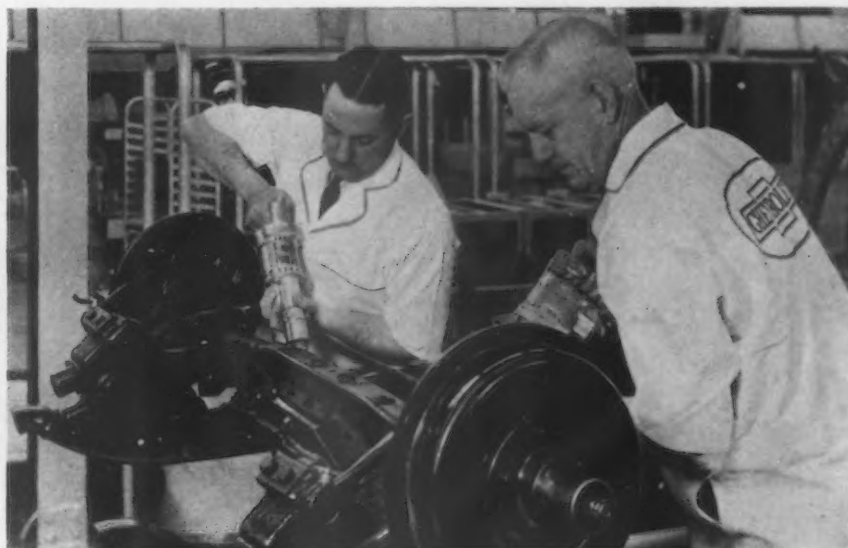
extrusion press it passes over one or more rollers and later is wound on reels. A space of considerable slack in the cable is left between the reel supports and the reels, in order to take up any unevenness between the speed of extrusion and the positive drive of the reel. This slack is necessary in any case where the operation is interrupted, because it is impossible to stop the heavy weight of the lead sheath all instantaneously, and

the slack provides for the slight movement of the reel after the press has stopped. Some manufacturers have automatically governed the speed of the reel by means of an idler which rests on the slack cable. If the reel movement is too rapid, the cable will tend to rise, moving the idler and operating an electric regulating device. Similarly, if the cable droops too much, the control device will speed up the movement of the reel.

Assembling Automobile "Knees" at Fair

ONE of the first operations on the Chevrolet car assembly line at the Chicago Fair is the mounting of the knee action units on the inverted chassis frame. The underneath appearance of the new construction in the accompanying photograph shows the extremely rigid front-end member,

with the deep pressed-steel channel that takes the place of the conventional front axle. The front end cross-member, knee actions, brakes and steering connections, which together form a single assembly, are made at Detroit for all the Chevrolet car assembly plants in this country.



Choosing the Right Drive—13

By WILLIAM STANIAR

Mechanical Power Transmission Engineer
E. I. DuPont de Nemours & Co.

A MECHANICAL coupling for high torque service, although it may serve as a flexible connection between motor and load, cannot be classed as a flexible coupling because its chief function is the automatic acceleration of high inertia torque loads. Certain couplings of this type due to their construction are capable of a moderate amount of flexibility, which in some cases may be ample for the requirements. Where extremes of lateral or angular misalignment are probable, resort should be made to a regular flexible coupling in conjunction with the high torque coupling.

The principle of the coupling in question is similar to the high starting-torque clutch in that it must be constructed to allow an appreciable period of automatic slip before the actual driving surfaces contact. To accomplish this mechanically, the action of centrifugal force is utilized.

An efficient and dependable device for this service, known as the slip-

ring starting coupling is illustrated by Fig. 81. Its chief function is in connection with constant speed motors driving apparatus possessing heavy inertia starting-torque, its object being to impart to the driven machine a slow start with uniform acceleration. It relieves both motor and machine of undue strain and shock, and in addition renders unnecessary elaborate electrical or mechanical starting equipment. The motor can be started by a simple switch, and, with no further attention from the operator, the driven machinery is brought to full running speed at the maximum desired rate.

Slip-Ring Starters

The slip-ring starter is composed of three elements: the spider, the friction band and the drum. The spider is keyed to the motor shaft, while the drum is keyed to the driven shaft; the friction band is weighted and lies inside the drum, one end engaged by a pin projecting from the spider by

which the friction band is pulled. The rear or trailing end of the band is free. As the motor accelerates, centrifugal force causes the band to expand and exert a frictional drag on the drum, the torque thus transmitted depending upon the motor speed, diameter of drum and weight of friction band. Torque transmitted by this device is practically independent of co-efficient of friction, a characteristic which differentiates it from the average frictional device. This results in a constancy which is novel and apparently at variance with previous engineering experience.

An actual installation of this device is shown by Fig. 82. The driven machine is a centrifugal dryer with extremely high starting-torque. It was originally driven by a 35 hp. motor which started under a 300 per cent over-load taking 75 to 80 sec. to reach full speed. The illustration shows a 20 hp. motor "across the line" started equipped with a 25 hp. slip-ring coupling which brings the dryer to

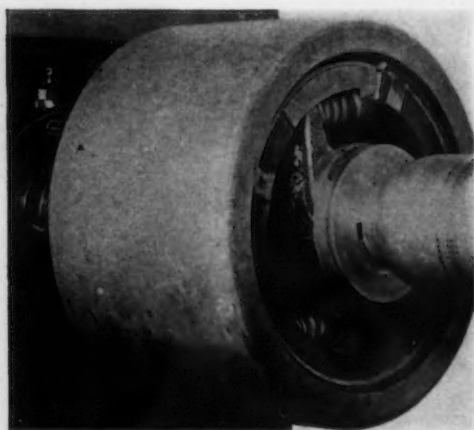


Fig. 81—Slip ring starting couplings give slow start and uniform acceleration.

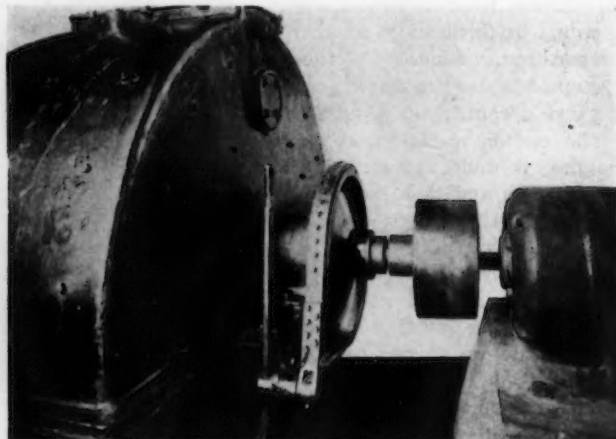


Fig. 82—Slip ring starting coupling driving centrifugal dryer.

Mechanical Connectors

for High Starting Torque



full speed in 50-55 sec. with a flat peak load curve of 25 hp. and a running load of 18.5 hp. The coupling allows the motor to reach full speed in 1.5 sec. Another actual installation illustrated by Fig. 83 shows a 300 hp. motor equipped with a 400 hp. capacity, slip-ring coupling driving a large hammer mill. With a conventional coupling it originally required 40 sec. for the motor to reach full speed. The installation of this starting device permitted the motor to accelerate to full speed in 10 sec. and the mill 16 sec. later with a current peak period reduction from 40 to 6 sec.

This coupling can be designed to transmit any required torque at a specified revolution per minute. Usually the friction bands are weighted and proportioned to transmit a maximum of 125 per cent. of the rated

horsepower of the motor, but where considered expedient to subject the motor to greater overload, that is to reduce the time required for acceleration, the degree of this overload must be taken into consideration. This device can, under normal conditions, remain in a stalled position for a considerable period of time without injury to itself or the motor. It can be installed either vertically or horizontally and can also be employed as shown by Fig. 84 for high starting-torque flexible drives.

A Moderate Power Starter

Another mechanical coupling for high starting-torque service and possessing a moderate amount of flexibility capacity is shown by Fig. 85. This device is efficient and dependable and, although designed for horsepowers ranging from 3 to 400, its

greatest utility no doubt is in the moderate power field. Based on its construction and principle of operation, its initial cost is lower than the starting coupling previously discussed. The primary duty of this coupling is the automatic acceleration of a load by the action of centrifugal force when direct connected to a high speed "across the line" motor. This function is accomplished in an extremely simple manner. It is constructed of two drum shaped members, one attached to the driving shaft, the other being attached to the driven shaft. Between the driving and driven members, there are inserted two sets of floating segments made usually of brake lining reinforced with lead. The amount of lead is governed by the required centrifugal pressure for carrying the load. So as to furnish the correct combination of smooth

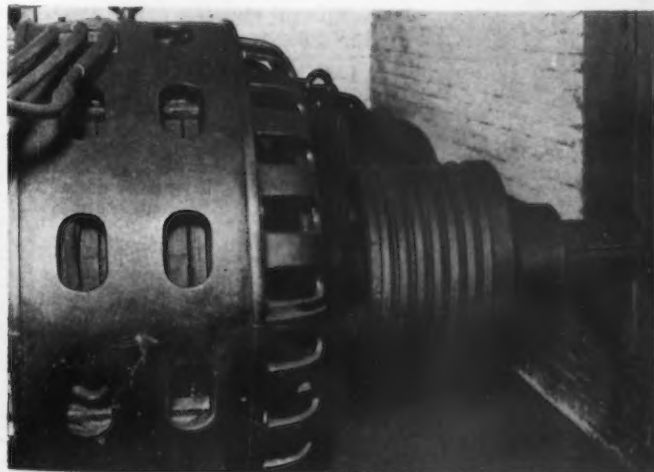
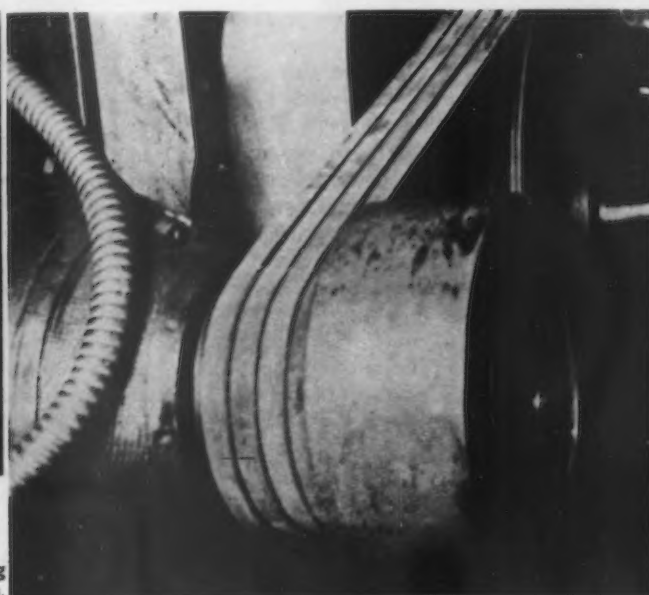


Fig. 83—Slip ring coupling of 400 hp. capacity driving large hammer mill. ▲ ▲ ▲



▲ ▲ ▲ Fig. 84—Slip ring starter for high starting torque flexible drive on textile machine.

starting and overload protection, the outer segments are actuated by the driving member and the inner ones by the driven member.

Squirrel cage motors are available for either normal or high starting-torque, but in view of the higher initial cost of the latter, the normal torque squirrel cage type is generally employed. Therefore, without the use of a device for gradually accelerating the load the normal torque motor, even though large enough to carry the running load, may not possess enough no-speed torque to overcome the combined inertia and starting friction loads of the driven machine. This re-

further starting capacity. This enables the motor to slow down momentarily as the load is applied, thus affording it maximum or high slip torque, comparable to the starting of the special high torque squirrel cage motor. In addition to these features, the "jerk" of starting is eliminated and the inrush of electric current is greatly reduced because of the extended time of starting the load—a substantial advantage where a "demand" rate is charged for current.

Normally the outer shoes are designed to transmit torque corresponding to the rated motor horsepower and speed, while the inner shoes are

and wire reeling, it is frequently desirable to extend the period of starting beyond normal, because the smoothest possible starting is needed to prevent breakage of the product. In this coupling this can be accomplished by decreasing the pressure in the outer shoes by putting less weight in them and building up the remaining required pressure to correspond to the full motor torque in the inner shoes.

Heavy Starting Loads

Regardless of the trend to direct rigid connection it is frequently necessary and desirable to direct connect heavy starting loads by flexible mediums such as V-rope, chain and flat belting. In view of this, practically all of the high starting torque devices available are designed to act as the driver from the motor in the form of a sheave, sprocket or pulley. Their respective mechanisms can be

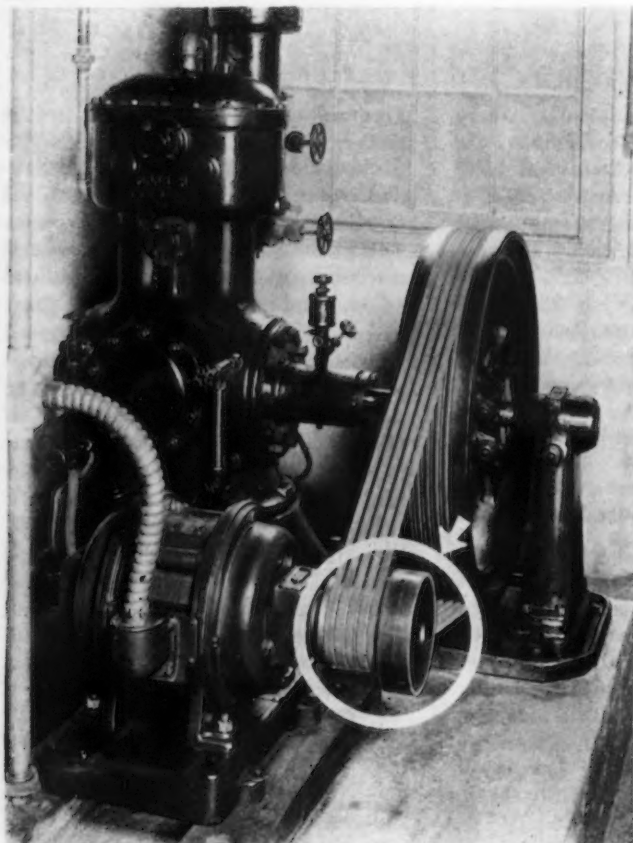


Fig. 85—Centrifugal starting device installed in connection with V-rope drive (at left).

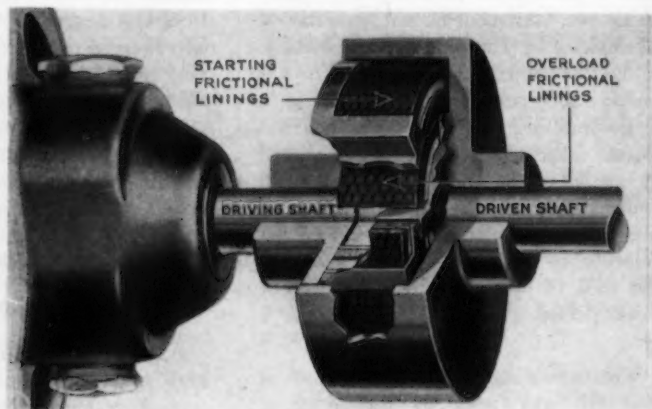


Fig. 85—Mechanical starting coupling designed for moderate power field (above).

sults frequently in starting difficulty and unless an auxiliary device is employed necessitates selecting either a larger capacity motor, a high torque motor or a wound rotor motor with added expense for both motor and controls. Decreased running efficiency due to operating at part load must also be considered. The coupling under discussion allows a standard squirrel cage motor to start without external load, the only resistance being its own inertia and negligible friction. As a consequence the motor accelerates rapidly. In this device as the starting shoes take hold, the driven apparatus builds up speed, actuating the driven shoes which add

figured for 40 per cent rated motor torque, since this proportion meets most conditions of starting. If the entire capacity were put into the outer shoes, it would shorten the period of starting, but by placing part of the capacity into the inner shoes, the desired overload protection is obtained without sacrifice of smooth starting and with minimum inrush current to the motor. For special high torque applications, the capacity of both sets of shoes can be changed to furnish practically any desired result. Where extremely hard starting is encountered, a greater than normal capacity can be built into the starting shoes. In machinery such as textile winding

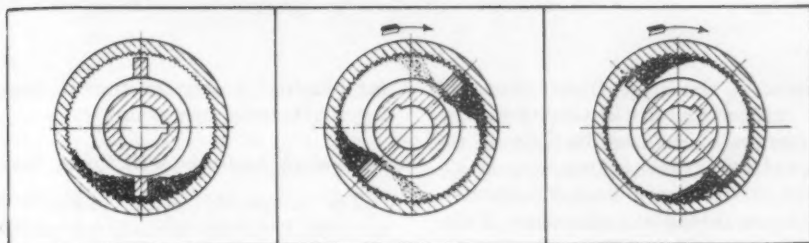
incorporated in either one of these methods. A V-rope application from a standard squirrel cage motor to a refrigerating compressor employing a centrifugal starting device is shown by Fig. 86.

A high torque starting device, particularly designed for the flexible connection service is shown in the form of a motor pulley by Fig. 87. The design involved is a radical departure from the average device in that it utilizes the action of centrifugal force on small steel shot confined within its mechanism. It is constructed of a driving member termed the "Rotor," which in effect is a two-bladed paddle wheel keyed to the motor or prime mover shaft. The driven member of the device termed the "shell" is equipped with two end plates to form a complete closure around the rotor, resulting in a housing free to revolve on the rotor ends. The inner surface of the shell or driven member is serrated axially to provide a grip for



Fig. 87—Motor pulley starter employing steel shot mechanism.

Fig. 88—Principle of the starter employing steel shot, shown installed in Fig. 87.



the steel shot which consists of small hardened steel balls approximately 0.020 in. dia. These shot or balls constitute the power transmitting medium between the driving rotor and the driven shell. They are graphite coated for lubrication and atmospheric protection and are the same size for all power ratings.

The unique principle and action of this device is shown by Fig. 88. At the start of the motor, the rotor of the device which is keyed to the motor shaft describes a shoveling action on the steel shot, the shell of the device for the moment remaining at rest. As rotation proceeds each wing or paddle of the rotor alternately lifts a mass of the shot to a horizontal position, then allows the shot to drop back to the bottom through its openings. A considerable amount of the shot also escapes through the clearances around the paddles and for the instant gravity controls the action of the shot. As the motor accelerates, centrifugal force increases and the rotor reaches high speed, but the housing or shell is still at rest. The masses of shot swept to the serrations of the shell by the paddle tips cause the shell to begin rotating. This action enables the motor to accelerate to full speed practically without load, regardless of the fact that the shell is connected to the driven load. The slowly accelerating shell by the aid of centrifugal force effects a perfect division of the shot mass between the two paddles of the rotor, with consequent balance of the unit. As the shell passes through a critical speed the centrifugal force at the serrations equals the force of gravity causing the grooves or serrations to carry the

shot through a complete revolution without dropping them. The driving effect of this device is dependent on the size of the permanent shot piles at the paddles. More shot adds weight and also forms broader base piles, thereby increasing the interlocking area of the paddle piles against the shell serrations. The angle of rest of the shot under high centrifugal force holds the shot in piles while the shell and rotor are operating at the same

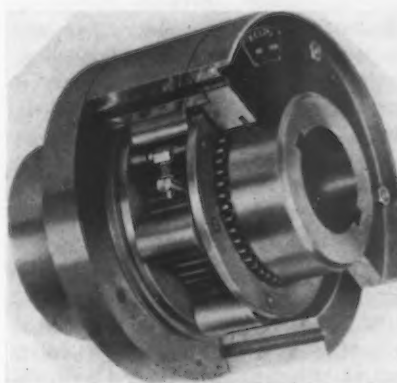


Fig. 89—Disconnecting, or free wheeling clutch.

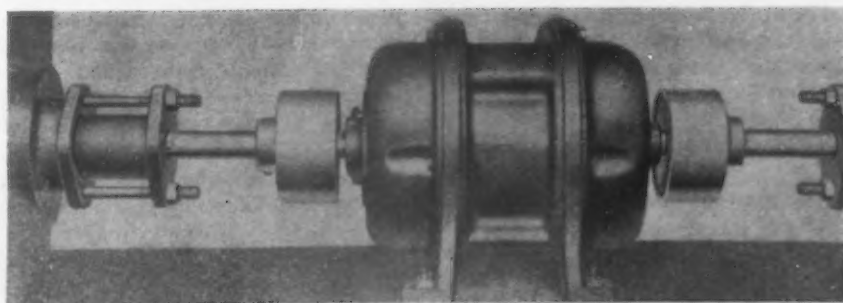
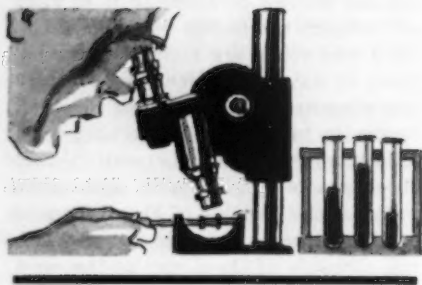


Fig. 90—Free wheeling clutches connecting motor to two agitators.

speeds, instead of allowing it to slide off through the paddle openings. The shell and rotor are kept at the same speed by having sufficient shot to cause the wing or paddle piles and the shell layers to interlock. These shot piles hold their interlocked position and thereby effect a metallic connection between the paddles of the rotor and shell and hold the driven and driving elements of the device at the same speed.

Free Wheeling Coupling

It is frequently of advantage in industrial driving to couple two prime movers to a common load so that one prime mover can be stopped without disturbing the driving action of the other. This function is usually accomplished by some form of disconnection or by interposing an interlock between the two power sources to prevent them from pulling each other through the load. This problem can now be solved in a simplified and efficient manner by the installation of a recently developed device known as a "free-wheeling clutch," shown by Fig. 89. An installation of this device, wherein one motor is connected through the agency of two free-wheeling clutches to two agitators, is shown by Fig. 90. The clutch allows one agitator to idle while the other is being driven. It is not in reality a high starting-torque device, yet it possesses an appreciable amount of load pick-up ability. It consists of a driving gear, a set of cam gears, a cam ring, a driving flange, and a cam plate. The driving gear is keyed to the motor or prime mover shaft and meshes with the set of cam gears which are mounted in a suitable cage, the cam gears being spring regulated. This entire cage assembly is arranged so that the cams engage the inner surface of the cam ring which is bolted to the driving flange. When the driving gear is rotated in the driving direction it turns the cams in such direction that they grip the inner surface of the cam ring and through the flange drive the load. (Concluded on Page 78)



Wrought Iron and

TO bring about a better understanding among users of wrought iron concerning its underlying characteristics, and also the meaning of test results and the various factors by which the quality may be judged, Committee A-2 on Wrought Iron of the American Society for Testing Materials submitted a report to the recent meeting of the society entitled, "Quality Standards for Wrought Iron."

In 1930 the committee, departing from the practice of defining the material on the basis of the method of manufacture, described wrought iron as follows: "A ferrous material aggregated from a solidifying mass of pasty particles of highly refined metallic iron with which, without subsequent fusion, is incorporated a minutely and uniformly distributed quantity of slag." There is excluded, on the one hand, steel, no matter how pure, because of an absence of "minutely and uniformly distributed slag;" and on the other hand, adulterated material resulting from scrap busheling, because of failure to "aggregate from a solidifying mass of pasty particles."

While the definition no longer limits wrought iron as a product of the puddling process and is regarded as specific in covering characteristics of the material, the committee compiled an extended statement on the physical properties, chemical composition and internal structure as a means to determine quality and to identify the material from other classes of ferrous products. Following is the committee's discussion of the quality standards:

Physical Properties Largely Those of Pure Iron

The physical properties of wrought iron are largely those of pure iron. The strength, elasticity, and ductility are affected to some degree by small variations in the metalloid content, and in even greater degree by the

amount of the incorporated slag and the character of its distribution. Up to certain limits, the ductility is increased by extra working, due to its effect in causing a finer distribution and more thread-like character of the incorporated slag. This may be accomplished in practice by the large reduction of section obtained in rolling or forging large initial blooms into proportionately small final sections; or by rolling smaller initial masses to bar sections, which are in turn built into "piles," heated to welding temperature and rolled to desired forms. In common practice this is done once for "single refined" wrought iron and twice for "double refined" products.

The properties of wrought iron, in common with other ferrous types, are influenced by the composition. Carbon content, either through incomplete elimination or where steel scrap may be used in adulteration in "busheling" or in making up piles, is reflected in increased tensile strength and elastic limit. Phosphorus acts in a somewhat similar fashion, and has the marked effect of promoting brittleness under high heat influences, such as result from welding pipe.

The physical properties of wrought iron, unlike those of steel, are markedly different in a direction transverse to rolling as compared with those in the longitudinal direction, due to the nature of the slag distribution in the two directions. The transverse strength and ductility are materially lower than the longitudinal properties, depending to a large extent upon the rolling history. By proper equalization of rolling in the usual longitudinal and transverse directions, it is possible to effect an equalization of the customary directional properties. Recognition must be given that such practice results in intermediate values for ultimate tensile strength and elongation between those normally resulting in longitudinal and transverse directions. This feature in the case of wrought iron plates has a particu-

lar bearing in connection with flanging or forming operations.

Chemical Analysis Will Cover Slag

The commonly given analysis of wrought iron lists carbon, manganese, phosphorus, sulphur, and silicon. However, since wrought iron is a composite material consisting of an intermingling of base metal and slag, and since the above constituents are distributed in greater or less degree between the metal and slag, it will be realized that the desirable analysis is one which discloses this distribution. Analyses for determination of slag quantity have been developed and progress is being made on methods whereby the position and amount of the several elements in metal and slag may be determined. As yet they are not adapted to usual laboratory procedure. The following general comments may be made:

Carbon: The carbon content is usually lower in wrought iron than in steel, but it is not lower than in the class of open-hearth product known as ingot iron. The refining is carried to a high degree and the additions commonly made in finishing a heat of steel are not made in the manufacture of wrought iron. Consequently, quality wrought iron has usually been associated with low-carbon content, 0.02 or 0.03 per cent being quite typical. However, much high quality wrought iron has a carbon content of 0.08 or even 0.10 per cent. Higher amounts may be an indication of imperfect or incomplete refining (raw iron) or may awaken a suspicion that steel scrap has been used in busheling or piling. However, if carbon of higher than customary amount could be retained in or added to wrought iron, without losing the inherent characteristics of this product, benefit might be derived in certain uses due to higher tensile properties resulting.

Manganese: The element manganese is quickly eliminated in cus-

What Determines Its Quality

tomary iron and steel refining reactions. Its presence in steel in relatively large amounts, 0.30 to 0.75 per cent, is the result of additions made necessary to counteract deleterious effects of the refining operation. In wrought iron manufacture, no such additions are made; consequently, well made wrought iron usually has a manganese content below 0.05 per cent. Higher manganese might be the residual resulting from imperfect refining of a relatively high manganese charge; or it may indicate adulteration by the use of some steel in busheling or piling. Manganese above 0.10 per cent in wrought iron is quite indicative of a mongrel product.

The virtual absence of manganese in wrought iron, and its almost universal presence in steel, has resulted in the manganese determination being used as a means of identification and differentiation. With adulterated products, due to averaging the mixture of wrought iron and steel, some uncertainty may arise in identification; likewise ingot iron (open-hearth iron) has a low manganese content conforming to usual wrought iron characteristics.

While manganese has been blamed as a factor promoting increased corrosion, it is doubtful if it deserves the stigma. Also, it is quite probable that quality wrought iron carrying higher manganese would gain in strength and ductility without material loss in its other desirable attributes.

Phosphorus: The phosphorus content is almost invariably higher in wrought iron than in steel. It is in part alloyed with the base metal and in part associated with the slag. In excellently made wrought iron, the phosphorus may be 0.10 per cent or even less; and again it may be 0.25 per cent or more. The differences are linked with the character of charge material, with some of the refining reactions, and with the intended purpose of the product. They are not a criterion of quality of product, but

rather of manufacturer's preference. In general, it may be stated that the lower order of phosphorus is advisable for products where higher ductility is desirable; where shock is a service factor, or where high heat effects might leave residual brittleness. However, it is the phosphorus content of the base metal which is primarily responsible for these effects and, consequently, the distribution of the element is a most important factor.

Sulphur: The element sulphur is always undesirable and is a promoter of "red-shortness" and corrosion. In well-made wrought iron it should not exceed 0.05 per cent, and it is usually less than 0.03 per cent.

Silicon: The element silicon is quickly removed in the refining of iron and steel, and the oxidized product becomes an important constituent of refining slags. In steel analyses, that noted in the final product is an added amount alloyed with the metal. In wrought iron, it is almost entirely a constituent of the slag. A silicon content under 0.10 per cent in wrought iron indicates that there is a subnormal quantity of slag for most products, or that a normal slag quantity is below normal in its SiO_2 ratio. A high silicon content, above 0.20 per cent, is a general indication of above normal slag quantity, usually resulting from insufficient work in ejecting the excess. Naturally, repeated working of wrought iron will be accompanied by a lowering of the slag quantity.

In view of the fact that wrought iron is a composite material, methods

of examination which reveal the character of association between metal and slag are of paramount importance in identification and determination of quality. Such evidence may be visible to the naked eye (macroscopic) or may necessitate the use of higher powers of the microscope.

Macroscopic Examination: The nick bend, or fracture test, has long been a favorite way of rapidly distinguishing wrought iron from steel. The former exhibits a well-known fibrous fracture, as contrasted with a crystalline break of the latter. At times there may be confusion, since dirty steel may show a semblance of fiber; while on other occasions good wrought iron may break with a pseudo-crystalline fracture, due to high carbon, high phosphorus, overheating, or sudden break. Where the material is in question because of suspicion of scrap adulteration, the fracture test is of doubtful value and is likely to be misleading, if it is the sole reliance for basing judgment.

Deep etching with acid is a prevalent inspection method in selection of wrought iron products; particularly (1) as a means of disclosing method of piling, etc.; and (2) for the detection of adulteration with steel scrap. Wrought iron etches deeply, with a roughened, stringy or woody surface; whereas steel will show a comparatively smooth surface. Consequently, a mixture of wrought iron with steel will exhibit a mixed type of surface, if the distribution is sufficiently coarse to be discernible. The etch test is a useful aid in the relatively rapid determination of adulterated wrought iron, and it has some value in detecting coarse slag pockets; but it is not of great assistance in the determination of the finer points of quality.

Microscopic Examination: The slag in wrought iron has a thread-like distribution in the metallic matrix; it is uniformly disseminated and there will

(Concluded on Page 78)





The new B.M.T. stainless-steel, five-section car on a siding at the plant of the Edward G. Budd Manufacturing Co., Philadelphia, the builder.

Stainless Steel Elevated Train To Make Debut

A FIVE-SECTION subway-elevated car of stainless steel, powered for an acceleration never before associated with a vehicle of any kind and braked without touching a wheel, has been delivered to the New York Rapid Transit Corp'n. The car, built by the Edward G. Budd Mfg. Co. in Philadelphia, and equipped electrically by the General Electric Co., is similar in structure to the Burlington Zephyr which also was built by the Budd Co.

The new light-weight car, designed to speed local service up to almost express schedule by quicker acceleration and deceleration without reinforcement of the elevated structure,

was built under authorization of the Transit Commission and is to be used experimentally on the Brooklyn-Manhattan Transit Corp'n's. lines to determine whether cars of this type should be placed in general service.

While the light weight of its stainless steel construction and its power and braking systems are outstanding features of the car, it incorporates many new developments and improvements designed for economical operation and for the convenience and comfort of passengers.

All trucks are mounted in rubber to deaden noise and shock. The lighting treatment is novel, all bulbs being concealed in two coves so formed and

arranged that the reflected light is of equal intensity over every square foot of the car regardless of whether the passenger who wishes to read is sitting or standing. The necessity for crowding and jostling to get in or out is reduced by the door and seating arrangement, which is such that no passenger is more than eight feet from an exit. The floor is of inlaid cork which not only insulates against sound and cold but is easy on the feet. And with the thought of foot comfort again in mind, the engineers have designed the heating and ventilating system so that in winter warm air is projected across the floor; in summer blowers augment the open windows in creating a comfortable circulation of

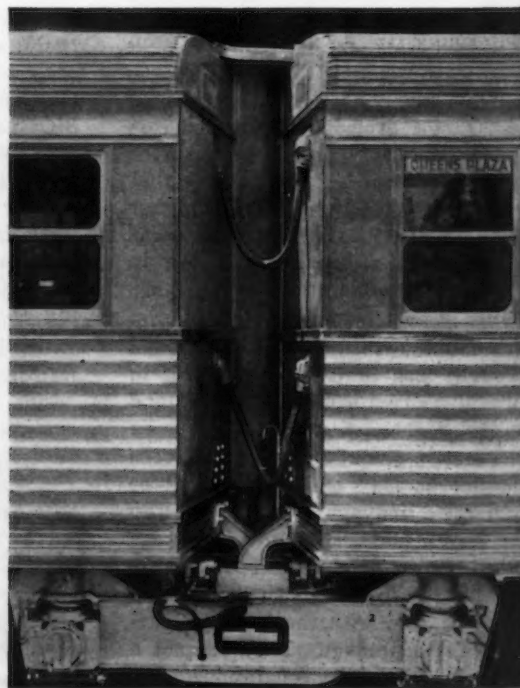


AT LEFT

Interior view, showing stainless steel construction of the roof, sidewall and floor.

AT RIGHT

Close-up showing articulation of units. Passengers may pass readily from one section of the car to another.



▲ ▲ ▲

The interior of the car is light, cheerful and roomy. Photo shows one end of the forward section. The door leads into the operator's cab.

▼ ▼ ▼



air. The car has a seating capacity of 170 and a standing capacity of 470, a total of 640 persons.

In appearance, as well as in performance, the car is different from anything ever seen on a subway or elevated track. The exterior is of bright unpainted stainless steel; the car sections are shorter than those now in use; and they are articulated, which is to say that adjacent ends of two sections rest on a common truck, thus eliminating four trucks in a five-section car. By reason of this articulation, the several sections perform as a single unit instead of so many individual cars whose ends fight each other in starting, stopping and negotiating curves.

The light weight of the car—it weighs only half as much as a comparable car of conventional design—

is made possible by the shot-weld method of fabricating stainless steel. By the use of this method, thin strips of stainless steel are welded into skeleton beams and other structural members and they in turn are welded into sections so that each becomes virtually one piece of steel without a rivet in it. The result is a great reduction in weight without loss of strength.

This saving in weight makes possible a greater acceleration and deceleration with resultant quickening of schedules. With a 70 hp. motor driving each of the 12 axles and availing itself of every pound of traction, the anticipated acceleration is five miles per hour per second. Tests have shown this to cause no passenger discomfort so long as the acceleration is smooth. Articulation on the one hand and new electric power con-

trol on the other insure this smoothness. Equally rapid deceleration is provided by eddy current braking which reduces the speed of the train without the application of brake drums to the wheels. In addition there is emergency and manual operation of the drum brakes.

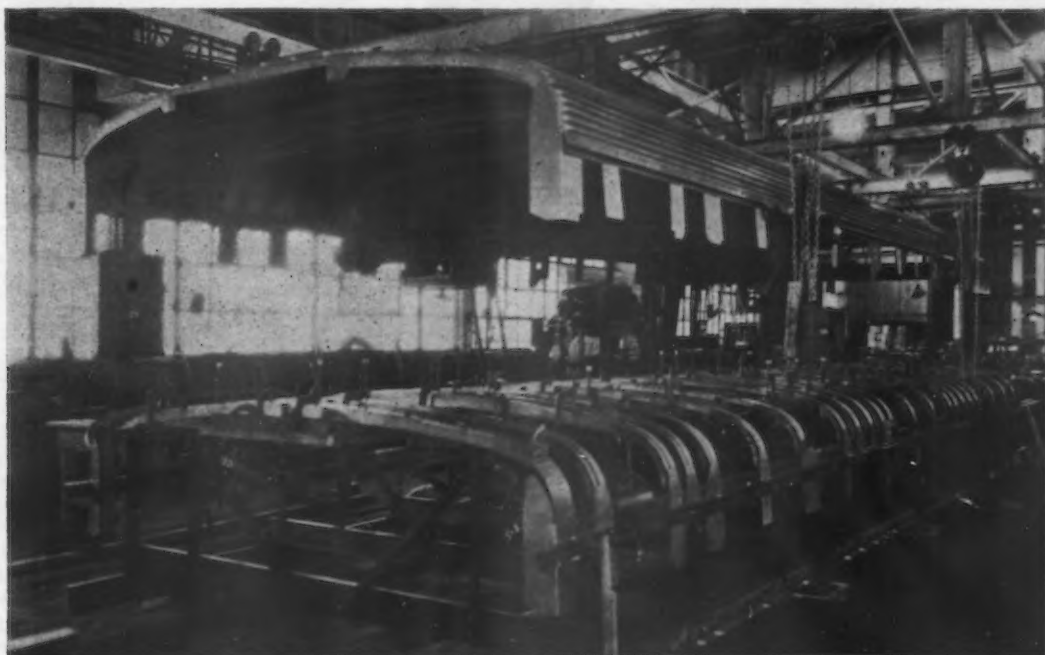
Using the more conservative figure of three m.p.h.p.s. for general operation, the builders have estimated that the train will have an average scheduled speed of 18.75 miles an hour with a distance of 1860 feet between stops and 15 seconds per stop. The free running speed is from 50 to 55 miles an hour.

The fact that the car is intended for one-man operation largely influences the character of the appointments. All control is centralized in the two operator's cabs, one at either end, so

▲ ▲ ▲

A car roof, welded into a single unit. Below, members assembled for the welding of roof for another car.

▼ ▼ ▼



that the operator can control motor power, braking, heating and ventilating, lighting, destination signs, and the signal system.

All doors are electrically operated, a feature which is a new development of the General Electric Co. A hand caught between a door and the jamb

would suffer no injury, but the door would fail to latch and the train could not be started. A signal in the cab would register the difficulty so that the operator could again open the doors. Twenty-three destination signs, distributed throughout the train, are operated electrically and are under control of the operator.

the 36-in. length machine weighs approximately 13,000 lb. and the 192-in. length unit 26,000 lb.

Profiling Attachment for Milling Machines

THE profiling and die sinking attachment here pictured, built by the Cleveland Profiling Machine Co., 750 Prospect Avenue, Cleveland, is designed for mounting on the overarm of any universal milling machine in the same manner as an arbor support. When not required it may be removed easily and stored within small space. Simplicity, accuracy, and rapid operation are features claimed.

Arrangement of the device may be seen in the illustration. Two arms on the attachment extend over the table from a hinged shaft supported

New Norton 16-In. Cylindrical Grinding Machine

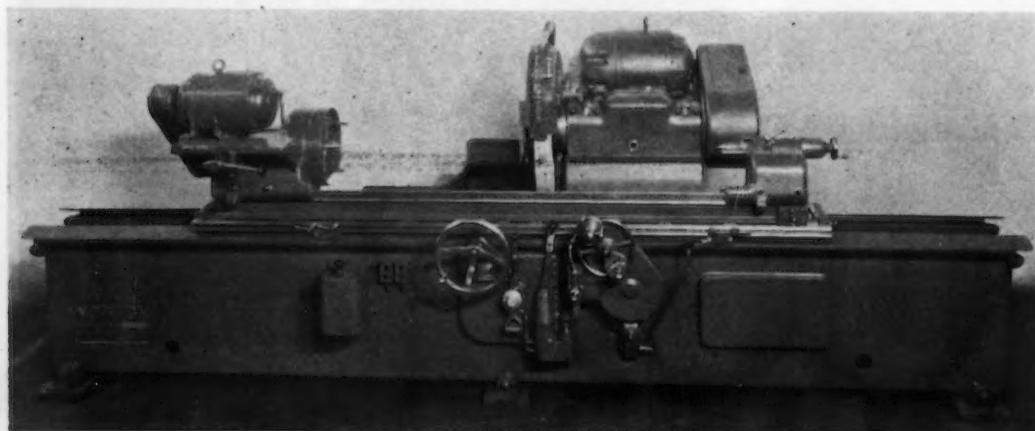
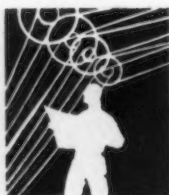
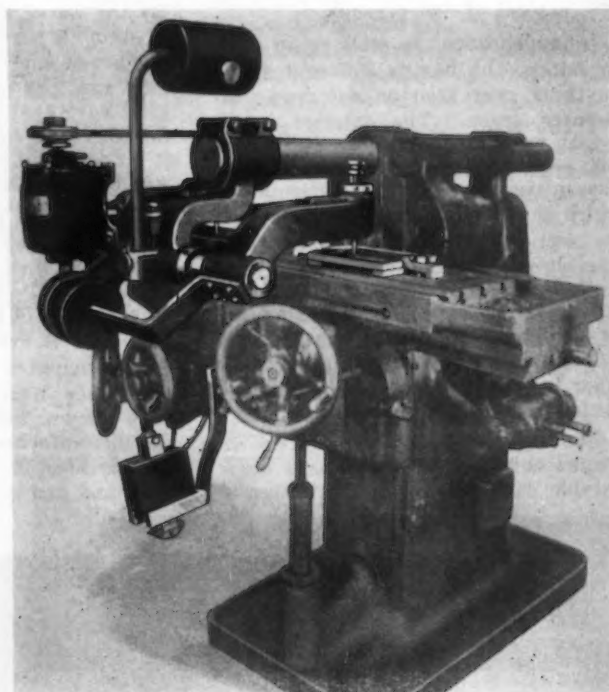
THE 16-in. type C cylindrical grinder recently added to the line of the Norton Co., Worcester, Mass., is similar to the 10-in. type C machines announced a few months ago, but is considerably larger and heavier in every detail. It is offered as a motor-driven machine only, the grinding-wheel spindle being driven by an individual motor mounted directly on the wheel-slide and the headstock by an adjustable speed direct-current motor mounted on the unit. A third motor drives the pumps and table traversing mechanism. The machine swings 16½ in. over the table, mounts either a 30 or a 36-in. grinding wheel, and is built in eight different lengths from 36 to 192 in. It is offered with hydraulic or mechanical table traverse, and can be supplied also as a hand traverse machine.

The headstock weighs approximately 950 lb., and the footstock over 200 lb. The former has more than 19 in. of bearing on the table and the latter more than 14¾ in. of bearing. Both mount a 1¼-in. diameter center. A feature is the heavy grinding wheel unit, which weighs about 3400 lb. The wheel spindle, of heat-treated alloy steel, is more than 42 in. long, and the large bearing is 4¼ in. in diameter by 10½ in. long, and the small bearing 3¾ in. in diameter by 8½ in. long. Both bearings are flood lubricated with filtered oil. Three spindle sheaves are furnished, the change from one speed to another being made as easily as changing grinding wheels. The spindle is driven by vee belts direct from the motor, no idlers or intermediate shafts being employed.

Base ways, one flat and one vee, are 3½ in. wide and have an overall width of 16½ in. The ways of both the base and the wheel-slide are forced-feed lubricated.

Table speeds for hydraulic traverse machines range from 6 in. to 22 ft. per min. and on mechanical traverse machines from 7½ in. to about 9½ ft. per min. Complete with motors,

Profiling attachment mounted on milling machine overarm. As the table moves back and forth, the follower rides the pattern and the cutter reproduces the pattern contour on the work



The grinding wheel unit of this 16-in. cylindrical grinder weighs approximately 3400 lb. The machine has individual motor drives for the wheel-spindle, the headstock, and the pumps and table traversing mechanism.

on taper roller bearings, one arm carrying a cutting tool and the other a follower. The arms are rigidly connected so that the movement of the follower is accurately reproduced by the cutter. In operating the attachment, the table of the milling machine is elevated to bring the follower and cutting tool in a vertical position. The arms that hold them are then in a horizontal position, and the point at which the work is being done is in a horizontal line with the hinged shaft. As the table moves back and forth the follower rides the patterns and the cutter reproduces the contour of pattern on the work.

The pulley on the driving motor is interchangeable with that on the cutter spindle, making eight speeds from 800 to 5000 r.p.m. available. Automatic stops are adjustable for the work being done. When these stops are contacted an electric magnet is energized to feed the work laterally simultaneously with the reverse movement of the table. Suitable provision is said to be made to prevent damage should the magnetic cross-feed fail to function.

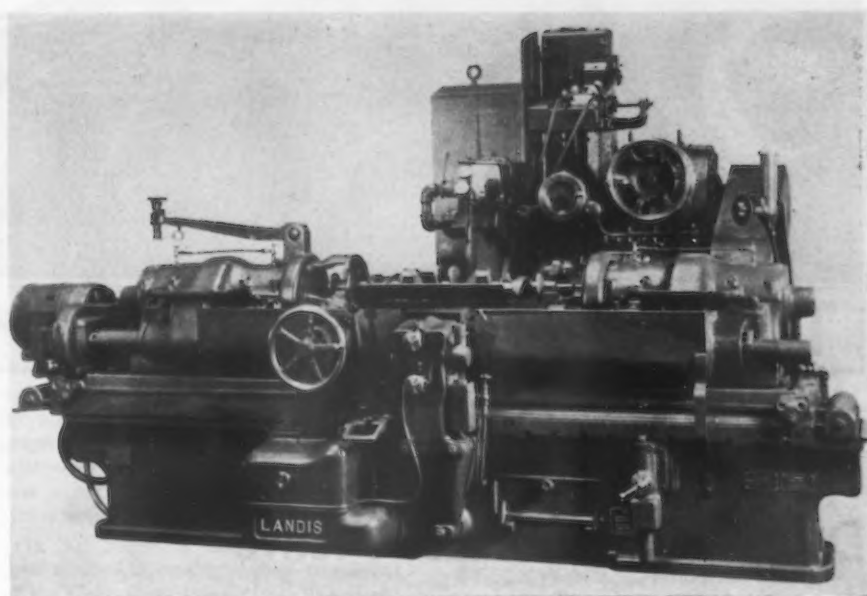
Portable Grinder Has Speed of 17,000 R.P.M.

NEW equipment announced by the United States Electrical Tool Co., 2490 West Sixth Street, Cincinnati, includes the Hi-Speed grinder illustrated, which is designed for removing excess stock and for finishing operations in automobile body plants, foundries, pattern, die and mold shops. The machine is of sturdy construction and is equipped with a universal mo-



tor by operating on direct or alternating current. It is obtainable in two sizes, both having a speed of 17,000 r.p.m. and can be furnished with or without a back handle.

Ampco Metal, Inc., 3830 West Burnham Street, Milwaukee, has received an order from the United Engineering & Foundry Co., Pittsburgh, for 50,000 lbs. of heat-treated aluminum bronze rolling mill bearing segments for the new sheet mill of the Ford Motor Co., Detroit. The metal from which the segments are being made is a culmination of more than two years of research by Ampco Metal under the supervision of G. K. Dreher, plant manager.



Hydraulic Crankpin Grinder Designed For Rapid Production

THE new 16-in. type D hydraulic crankpin grinder illustrated, being brought out by the Landis Tool Co., Waynesboro, Pa., is a massively-proportioned, rapid-production machine, and, like its predecessor, is designed to permit grinding of all the pins of any crankshaft on the one machine with but one handling of the work. The less handling, closer accuracy and other advantages of grinding all the pins on the one machine are said to have been brought about by attaching the work-rest to the front of the bed, and properly coordinating the work-rest jaw movement with the wheel feed, the table traverse and the means provided for clamping, radial locating and longitudinal spacing.

The bed is heavy. Work-table and wheel-head guides are of a size and spacing to assure adequate support, and crank head spindles and bearings are larger than before. The 25-hp. wheel drive motor is mounted on the rear of the wheel-head and drives the wheel-spindle on the end by means of multiple V-belts. The wheel-spindle is large and is supported solidly in long bearings of Landis habbitt-lined steel type. The stationary hydraulic work-rest is a massive casting bolted to the front of the bed. To provide added rigidity, the base is bridged over the work-table and bolted to the bed below and in front of the grinding wheel.

Convenient operation is also a feature. The distance from the floor to the work centerline is only 36 in., which facilitates loading of heavy crankshafts. The main control lever has a number of functions. As it is

shifted from one position to another it clamps the work, starts work rotation, advances the work-rest shoes, withdraws the work-rest shoes, disengages the spacing bar plunger, traverses the work-table either right or left, and releases the spacing bar plunger. Another lever, at the left of the main control, is used to unclamp the work.

A number of safety features have been incorporated. A mechanical interlock in the main control mechanism makes it impossible to traverse the table when grinding, or when traversing with the wheel in, as in truing, it is impossible to rotate the heads. The heads will not rotate with the work unclamped nor during work-table traversal. The work-table cannot be traversed as long as the work-rest shoes are in their operative position. Work rotation will stop automatically should pressure in the hydraulic system drop.

Hydraulic power is employed to traverse the work-table, feed the grinding wheel, operate the work clamps and spacing bar plunger and move the work-rest shoes. Work carriage guides are flood lubricated continuously with filtered oil. A 36-in. grinding wheel is standard but 42-in. wheel equipment is available. A wheel dresser built into the top of the grinding wheel fender is optional equipment. The dressing wheel is hydraulically driven.

Two sizes of the machine are offered, namely 16 x 32 in. and 16 x 42 in. The larger, without electric motors, weighs 17,250 lb. and requires floor space of 7½ x 13 ft.



British Iron and Raw Steel Dull, Finished Grades Active

LONDON, ENGLAND, July 17 (*By Cable*).—New business in pig iron is limited and a small surplus of stocks is accruing but the conclusion of the Scottish holidays is expected to improve the situation. Home consumption of hematite is heavy, but there is little export demand for this commodity.

Large outputs of semi-finished and finished steel are being maintained, although new orders for semi-finished have slackened.

Rail makers and structural rollers are busy and export orders for these commodities are improving.

United Kingdom exports of pig iron for June totaled 9415 tons, of which 50 tons were for U. S. destinations. Total exports of iron and steel were 204,139 tons.

Tin plate makers are receiving fair inquiries, both domestic and foreign, but closing of contracts is deferred pending definite international agreements, now reported to have been signed but not officially announced. Welsh makers met at Swansea Tuesday of this week and meantime, acting upon official advices, tin plate works have withdrawn their quotations. The greatest secrecy is being observed in connection with the Paris meeting of tin plate makers.

New business in continental iron

and steel is scarce owing to the holidays. Semi-finished and bars are fairly active in this market, although British demand is quieter. Continental mills have booked 6000 tons of sheets for Russia; otherwise, excepting in the Near East, business is slack.

The International Railmakers' Association has been forced to quote below official prices due to price cutting by Japan and Poland.

Pretoria, South Africa, output to June 12 was 40,000 tons of pig iron, 20,000 tons of raw steel and 9000 tons of finished steel. Baldwins and Lysaghts have arranged to dispose of the Pretoria black and galvanized sheet output, which is expected to reach 33,000 tons per annum by the end of this year.

The Australian Government has declined to lower the duties on galvanized sheets, in spite of a shortage of supply.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export	£9		
Billets, open-hrth.	£5 10s.	to	£5 15s.
Tin plate, per base box	17s.	3d. to	17s. 6d.
Steel bars, open-hearth	£7 17½s.		
Beams, open-hrth.	£7 7½s.		
Channels, open-hearth	£7 12½s.		
Angles, open-hearth	£7 7½s.		
Black sheets, No. 24 gage	£9 5s.		
Galvanized sheets, No. 24 gage	£11 5s.		

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £			
Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.			
Billets, Thomas	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Steel bars, merchant	£3 5s.		
Sheet bars	£2 8s.		
Plates, ¼ in. and up	£4		
Plates, 3/16 in. and 5 mm.	£4 2s. 6d.		
Sheets, ¼ in.	£4 7s. 6d.		
Beams, Thomas	£3 2s. 6d.		
Angles (Basic)	£3 2s. 6d.		
Hoops and strip base	£4 2s. 6d.		
Wire, plain, No. 8	£5 7s. 6d.		
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

Wisconsin Unemployment Insurance Rules Cited

IMPORTANT rules governing operation of the Wisconsin unemployment insurance law, affecting every employer of 10 or more persons, have been issued by the Industrial Commission of Wisconsin, the administrative agency. The regulations provide for monthly contributions and reports to the unemployment compensation division of the commission, to be made regularly by every employer included under the act. Payments of contributions are to begin in August on the basis of July payrolls. Forms for reports are in preparation and will be distributed shortly. Regulations announced by the commission are:

"Employers operating under the compulsory plan must make their payments to the Industrial Commission at the time of the filing of their reports. Employers operating under accepted voluntary plans must make payments to their benefit funds as called for in their plans and furnish

evidence to the commission that they have done so.

"Such employers must make the same monthly reports as employers under the compulsory plan and also the same contributions to the administration fund. These have been fixed for the first year of the act at one-tenth of 1 per cent, instead of two-tenths as permitted by the law.

"Overpayments made by employers in any month will be credited by the commission on the next month's contributions. Underpayments must be made good upon 10 days' notice. Receipts will be given by the commission for all payments made to it.

"Money contributed by employers under the compulsory plan will be kept in separate employers' accounts and can be used only for the payment of benefits to the employer's own employees. These funds will be invested by the annuity investment board in United States Government bonds and Wisconsin municipal bonds and interest earnings will be annually credited to the employer's account."

June Construction Awards Decline

JUNE construction contracts in the 37 eastern States amounted to \$127,131,200 according to F. W. Dodge Corp'n. This represents a gain of 24 per cent over the June, 1933, total of \$102,341,900, but a decline of 5 per cent when compared with the preceding month's \$134,438,700. The decline, however, is no more than the usual seasonal decline from May to June.

With reference to contemplated new construction, during June there was an increase of almost 30 per cent in the total volume of intentions to build. The month's total was \$313,882,300 as compared with \$241,271,200 for May and \$386,259,700 for June of last year.

Steel Beer Barrel Makers to Advertise

AT a two-day conference, the first to be held in the East, the Associated Manufacturers of Steel Beer Barrels met at the Hotel Lexington, New York, on July 12 and 13, and voted to launch a campaign of national newspaper and radio advertising and publicity to acquaint the public, the beer dispenser and the brewer with the advantages of steel packages for beer.

A scenario was accepted and a cast chosen for an industrial film which will tell the steel beer barrel story and will be shown throughout the country to brewers, brewmasters and retailers. It was announced at the meeting that the association represents an investment of approximately \$500,000,000 in the steel beer barrel field—a new industry which has sprung up since the return of legal beer in April, 1933.

Avey for President of American Foundrymen

THE 1934 nominating committee of the American Foundrymen's Association met at Atlantic City, N. J., June 28, with the following members present: Past President N. K. B. Patch, Lumen Bearing Co., Buffalo; Past President E. H. Ballard, General Electric Co., West Lynn, Mass.; W. C. Hamilton, American Steel Foundries, East Chicago, Ind.; E. F. Hess, Ohio Injector Co., Wadsworth, Ohio, and A. E. Boegehold, General Motors Research Laboratories, Detroit.

The following were nominated for officers and directors:

For President, to serve for one year: D. M. Avey, editor, *Foundry*, Cleveland.

For Vice-president to serve for one

year: B. H. Johnson, assistant to the president, R. D. Wood & Co.

For Directors to serve three-year terms: Frank J. Lanahan, president, Fort Pitt Malleable Iron Co., Pittsburgh; A. E. Harrison, general superintendent of foundries and pattern shop, Allis-Chalmers Mfg. Co., Milwaukee; E. W. Campion, assistant superintendent, Buckeye Steel Castings Co., Columbus, Ohio; Sam Tour, vice-president, Lucius Pitkin, Inc., New York, and E. O. Beardsley, president, Beardsley & Piper Co., Chicago.

Mr. Avey, the nominee for president, has served on many committees, including chairmanship of the program and papers committee and committee on international relations. He was a director prior to being elected vice-president.

B. H. Johnson was elected a director in 1928 and is a past president of the Gray Iron Institute. The nominees for directors represent respectively, and in the order listed, the malleable iron, gray iron, steel and non-ferrous casting industries, and the foundry equipment industry.

New British Steel Research Laboratory

THE growing part which research now plays in the Sheffield steel industry is illustrated by the opening of a large central research department for the United Steel Companies. The functions of this department include the planning and execution of research into new steels and new products of all kinds; the carrying out of more thorough investigations into the materials used than is normally possible in works research laboratories with special reference to the development of new refractory materials; and investigations of common interest to the whole of the combine's works and to the industry generally. These may be typified by research into the creep strength of metals on the one hand and improved chemical analysis on the other.

The new department is located at Stockbridge, nine miles from Sheffield. It is a two-story building, about 132 ft. long by 65 ft. wide, of steel encased in concrete and having pier foundations 14 ft. deep built on rock. A noteworthy feature of the laboratory is the provision of two high-frequency electric furnaces of 1 lb. and 18 lb. capacity respectively. These are interchangeable and work from the same 35 kv.a. unit. The larger furnace is employed chiefly for producing experimental ingots, the standard size being 12 in. long by 2½ in. square, tapering down to 2 in. square. It is capable of producing 18 lb. ingots from a cold charge every 45 min. Macroscopic examination is carried out to reveal the soundness, segregation, and structure of full-

sized sections of ingots, forgings, etc., and is an important application of research to steel manufacture with the object of producing sound and homogeneous ingots. This laboratory is undoubtedly one of the most up-to-date in every sense of the word possessed by the European steel industry.

Automatic Nut Co. Is Organized

A REORGANIZATION of the General Automatic Lock Nut Corp'n. has been effected and its business will hereafter be conducted under the name of the Automatic Nut Co., Inc., Chrysler Building, New York.

Trackwork Shipments Still Increasing

SHIPMENTS of trackwork for tee rail track of 60 lb. a yd. and heavier amounted to 6184 tons during June, according to the American Iron and Steel Institute. This was the largest movement since May, 1931, and compares with 5764 tons in the preceding month and 6132 tons in April. Trackwork shipments in the first six months of the year totaled 18,080 tons, compared with 5901 tons in the corresponding 1933 period and 8376 tons in the first six months of 1932.

Large Allotments Made For Dam Construction

WASHINGTON, July 17.—Allotments aggregating \$57,000,000 for dam and related work were announced last week by the PWA. All were made to continue work on the affected projects. The allotments were made up of \$25,000,000 for the Fort Peck Dam and reservoir in eastern Montana; \$18,000,000 for lock, dam and channel work on the upper Mississippi River; \$11,000,000 for the large power, navigation and flood control dam project on the Columbia River at Bonneville, Ore., and \$3,000,000 for construction of the Imperial Dam in the Colorado River for diversion into the All-American canal in the Imperial Valley of California.

The Kawasaki Plate Works, Japan, is to undertake the manufacture of galvanized hoop iron. German machinery is being installed at a cost of about 3,000,000 yen and production is expected to start next January.

The Turkish Government has placed contracts with Japanese shipyards for two cruisers, two destroyers and a number of auxiliary vessels.

United States Progress in Applications Of Steel Reviewed

INTELLIGENCE is something that cannot always be purchased. When one sets out in the open market to buy intelligence he usually pays a very high price for it. The American steel industry has undertaken to seek out intelligence among its own men, to foster, protect and encourage them. Today it is reaping the harvest of that ambition. The metallurgists, scientists, research engineers and other specialists, engaged directly by the more powerful companies, or in cooperation through research bureaus, testing laboratories or research foundations, have been able to keep the industry posted as to the possibilities of its product and advised as to its opportunities in the market.

Stainless Steel Market Expanding

One outstanding example of this is the production and use of stainless steel. First used in the making of cutlery, stainless steel was developed in England and Germany. In a commercial way it dates only from 1920. Today stainless is only one of the many steels of high strength that have been developed. Stainless steel is important because it resists corrosion. As a matter of fact, corrosion is so rapid in stainless steel that it immediately covers itself with an inert protective film which permanently seals the metal from further deterioration. Stainless steel will last to eternity; it is the most permanent material ever developed by man. It was used in an industrial way first in the food and chemical industries. It particularly appealed here because of its resistance to stains and corrosion. Stainless steel was then utilized in architectural adornment in buildings and automobiles. As a structural material it may just now be coming into its own, and for that development civilization is deeply indebted to the steel industry.

The cold-rolling of stainless steel sheets will rapidly increase their already great strength. Cold-rolling a sheet one-eighth of an inch thick to a sixteenth-inch thickness will approximately double its strength. This cold-rolling, however, does not in like proportion increase the strength of sheets of any thickness. The strength is added principally to the "skin" of the sheet and in thicker sheets this "skin" will not penetrate far.

Flanged Construction

Within the past year or so the engineering advisers of the industry

have found ways of forming the material to give it a strength in compression comparable to its great strength in tension. A flanged cellular type of construction has been developed. A corrugated box is of a flanged type of construction. The flanged cells prevent the thin material from buckling without adding anything of importance to the weight. As a consequence airplanes of greater lifting power and less dead weight have been developed. Chassis for trucks and buses have been developed having but a fraction of their former weight, thus saving considerably in cost of operation. On the railroads, also, passenger cars are being built of this material which will outlast anything heretofore built, and weigh less than one-third of the old style car. They can be run on pneumatic rubber tires and can be insulated from outside noise and dust.

Housing Developments

Continuous rolling mills make it more than ever possible for the industry to develop broader markets for plates, sheets and strip, the products of these mills. That probably accounts for the broad interest shown in steel walls and floors for houses. The steel floor seems to be going over with greater success than the steel walls. That is due, undoubtedly, to the fact that engineering development of the former preceded the latter.

Some of this lighter material is being pressed into light structural shapes and makes possible the steel frame house of the future. Within the past few months many houses of

this type have been sold in the earthquake zone. All over the country real estate projects are being developed which include houses of a like design. These residences will not only be fire-proof but they will also be shrink-proof and vermin-proof. With the recrudescence of home building, the steel industry is anticipating a new demand for light structural shapes.

Automotive Industry Played Part

Sheets find a ready acceptance in the equipment field. For the manufacture of furniture, refrigerators, cabinets and other vermin-proof equipment for the office and the home, steel sheets have no peer. Automobile requirements have also exercised a most important influence upon the development of sheets. It was only within recent years that the all-steel body came into production. That was made possible by the manufacture of a sheet that would withstand stamping, cutting and drawing. Sheets for automobile bodies are now being produced which are not injured or weakened at any point by reason of being put through the severe handling necessary in the molding of a body for a car. And these improved sheets are offering possibilities to the manufacturers of household equipment that they never had before.

Building for Economy

The skyscraper or multiple-story building is particularly a product of the steel industry. Today there exists three times as much unoccupied floor space as during normal times, and it is freely prophesied that no more skyscrapers will be built for many years. But skyscrapers were designed for economy and their height determined by the sale value of the land on which they were erected and the tax burden imposed upon real estate in congested city centers. The depression has demonstrated that the skyscraper as such can give a much better account of itself than can the older and the lower buildings which were not built for economic returns. It is all relative.

Builders concede, none the less, that while there may be no new skyscrapers in the immediate offing, other new and improved types of construction are going ahead this year which will require more steel. An instance is the light occupancy building of six to eight stories.

Surveys show that probably 90 per cent (Concluded on Page 67)

AT the recent International Congress for Steel Development held in London during June, reports on the progress of the industry in the various steel-making countries were presented. Developments in the United States were concisely reviewed by the American Institute of Steel Construction, Inc. As set forth here, the solid achievements of the industry in America during the depression and the first year of recovery compared most favorably with reports from England, France, Germany, Italy, Belgium, The Netherlands and Czechoslovakia.

PERSONALS

MALCOLM E. GREGG, since 1928 assistant district sales manager of the Milwaukee office of the Inland Steel Co., Chicago, has been appointed district sales manager succeeding the late HARRY L. MCCAULEY. A native of Milwaukee, Mr. Gregg became associated with the company in 1925 in the St. Paul district office and was transferred to Milwaukee in 1927. Previously he was with the Republic Iron & Steel Co. for 12 years, lastly as district manager at Buffalo. He was also affiliated with the Lackawanna Steel Co. at Buffalo and subsequently became manager of the company's office at Detroit.



M. E. GREGG

FREDERICK SALDITT, who has been identified for many years with the Harnischfeger Corp., Milwaukee, has been appointed manager of the export division of the company. He has had experience in practically every department of the company, in shop offices, service, engineering, sales and foreign divisions.

WILLIAM B. HENDERSON, secretary of the code authority and Washington representative of the Machinery and Allied Products Institute, has been named executive vice-president of the Refrigerating Machinery Association and will assume his new duties Aug. 1 when offices of the association will be moved from Philadelphia to Washington. He is also secretary of the Durable Goods Committee, which was selected at the Washington meeting of code authorities last March.

A. B. PETERSON, for many years chief of the division of tool and machine construction at the Hawthorne, Ill., works of the Western Electric Co., has joined the Federal Tool Corp., Chicago, as director and will take charge of sales engineering for the company.

C. A. MACFIE and C. C. FELTON have been appointed vice-presidents of Revere Copper & Brass Co., Inc., New York. Mr. Felton was formerly sales manager of the Calumet & Hecla Consolidated Copper Co.

JAMES T. WILSON, vice-president, Nash Motors Co., Kenosha, Wis., has resigned to devote his time to personal interests, but remains a director of the corporation and will continue his residence in Kenosha. He first became associated with Charles W. Nash in 1906 in the old Durant-Dort Carriage Co. and continued this affiliation at the Buick Motor Co. and General Motors Corp. In 1916 he

assisted in the formation of the Nash Motors Co. at Kenosha.

A. L. RALSTON has been made general mechanical superintendent of

the New Haven railroad, succeeding G. A. MORIARTY, who has been assigned to other duties. Mr. Ralston is a native of Brazil, Ind. He was graduated from Purdue University, and later, when associated with the Westinghouse Electric & Mfg. Co., helped design and construct the first electric locomotive built for the New Haven railroad.

H. K. POLLARD, since 1922 sales manager of the Crucible Steel Casting Co., Lansdowne, Pa., has resigned, effective July 31.

E. W. CAMPION has been made general manager of the Bonney-Floyd Co., Columbus, Ohio, manufacturer of steel castings. He was formerly with the Buckeye Steel Casting Co., Columbus.

JOHN J. WHITE, president of the Tube Reducing Corp., New York, has returned from a business trip to Europe. The trip was made in connection with the starting of operations at seven European plants which are manufacturing seamless tubing under the Tube Reducing Corp. patents.

J. F. Dewey New Pittsburgh Conciliator

WASHINGTON, July 17.—The National Steel Labor Relations Board has named James F. Dewey, Labor Department conciliator, as its observer and has assigned him to Pittsburgh for the present. It was stated that Dewey will report what happens rather than make any official investigation by reason of the refusal of the Republic Steel Corp. to renew its contract with the Amalgamated Association of Iron, Steel and Tin Workers.

G. E. Makes Good Sales and Profit Increases

SALES billed by General Electric Co. during the first six months of 1934 amounted to \$80,983,093.60, compared with \$61,773,414.19 during the corresponding period last year, an increase of 31 per cent, President Gerard Swope has announced.

Profit available for common stock for the second quarter of 1934 was \$4,253,595.86, equivalent to 15c. per share, or substantially the same as the quarterly dividend of 15c. per share to be paid on July 25 to approximately 192,000 stockholders, compared with 10c. per share paid to 184,000 stockholders a year ago.

Profit available for common stock for the first six months of this year was \$8,175,557.22, compared with \$4,666,080.69 for the first six months of last year. This profit is equivalent to 28c. per share for the first six months of 1934, and 16c. per share for the first six months of 1933, on 28,845,927 shares outstanding in both periods.

A comparative statement of sales and earnings for the first six months follows:

	1934	1933
Net sales billed....	\$80,983,093.60	\$61,773,414.19
Less: Costs, expenses and other charges	74,818,535.40	59,295,695.00
Net income from sales	6,164,558.20	2,477,719.19
Other income, less interest paid and sundry charges..	3,298,533.62	3,475,886.50
Profit available for dividends	9,463,091.82	5,953,605.69
Less: Cash dividends on special stock	1,287,534.60	1,287,525.00
Profit available for dividends on common stock (28,845,927 36/100 shares issued)....	\$8,175,557.22	\$4,666,080.69

Orders received during the second quarter of 1934 amounted to \$54,005,988, compared with \$35,539,858 for the second quarter of 1933, an increase of 52 per cent.



NRA Prepares for Metamorphosis

Rushing Final Code Clean Up Prior To Entering Administrative Phase

WASHINGTON, July 17.—With only 11 months of its existence remaining, unless continued by legislation, the NRA has taken a broad stroke looking to administrative work only and having passed the stage of being a one-man job, is headed for reorganization. Its operation hereafter may offer a good idea of what of its features may be adopted as a permanent part of the nation's business and industrial life. Constituting the axis about which business and industry have revolved, this "emergency" agency, with its widespread transformation in the economic life of the nation, has been both praised and condemned, either wholly or in part. The general reaction of business and industry, however, is that it has some essentials that must be maintained.

Outstanding are the fair trade practices. That this is realized is evident from the plan of self-government by business proposed by a subcommittee of the Business Advisory and Planning Council. The Chamber of Commerce of the United States and many other business organizations have also pointed to the importance of business setting its house in order and keeping it that way under its own stewardship through the power of enforcing fair trade practices, a problem which is perhaps the principal one now before NRA as it is preparing to turn almost exclusively to administrative work.

But whatever business and industry may desire, General Hugh S. Johnson, NRA administrator, has gone strongly on record against proposals that Code Authorities set up a business council to run business and in-

By L. W. MOFFETT

Resident Washington Editor, The Iron Age

dustry unless protection is given the public through Government representatives with veto power. Largely, it is believed, the necessity of some such Governmental authority is recognized by business and industry.

How Much Government Intervention?

It is, of course, a matter of how far the Government might go to upset plans of self-government in business. The New Deal itself has repeatedly called the NRA a plan for self-government by business. But it is clear there is a difference of view as to what self-government in business really means. Often rigid and arbitrary though it has been charged with being, certain powers of NRA likely will be continued, especially veto or like authority it exercises in enforcement of codes. Self-government in business also probably will see that organized labor, which has made such an intensive drive for power through the vehicle of the Recovery Act, will insist upon having something to say about self-government. To this important degree there will be a distinction between the application of fair trade practices under the original jurisdiction of the Federal Trade Commission and the system set up under the NRA.

The subcommittee of the Business Advisory and Planning Council, in its report to the full committee, proposed

establishment of "clearing houses" by industry and directed attention to its work in having set up joint committees to agree upon fair trade practices in about 200 codes, ready to adopt the plan for all businesses and industries and to take up the work of enforcement in anticipation of the possible dissolution of NRA. The report was filed by Lincoln Filene, Boston merchant, as chairman of the subcommittee.

Meanwhile, NRA has passed from the stage of being a one-man job. Administrator Johnson has so reported to the President, in urging reorganization under a commission form of administration, prepared to concentrate on its administrative work as soon as it winds up codification of all remaining industries. It is the purpose to expedite codification quickly through the order issued last week by General Johnson calling for the bringing under the Blue Eagle all industries which have not as yet adopted codes. For the most part they are small industries. In instances separate codes will be adopted for the major industries, including such important ones as the steel warehousing industry. It is proposed to put the basic code into effect within 30 days from the date of the order, announced July 12. It is estimated it will affect about 2,500,000 employees.

Johnson Still "The Works"

The order was promulgated by General Johnson, just prior to beginning his Western trip, to make several addresses and take a vacation, returning to Washington early in August. During his absence, NRA is being administered by G. A. Lynch,

the administrator's executive officer, though General Johnson is keeping in daily contact with NRA. Consequently, it is still a one-man organization and is not being operated by a board, as published reports said it would be. The plan in the mind of General Johnson, however, is to turn administration over to a commission. It remains to be seen whether President Roosevelt concurs in the recommendation.

There were reports, too, that General Johnson was about to leave NRA. The general himself said that if the commission is set up he would like to "avoid being one of its members." At the same time he said he would stay if the President wanted him to do so. Word came last Thursday from the President, aboard the cruiser Houston bound for Hawaii, that he expected General Johnson to continue administration of NRA, but that as far as the future of administration of the organization is concerned he had not determined what would be done. It is the idea of General Johnson that a commission should be set up from within the NRA to administer the organization. He is not in favor of the Federal Trade Commission having charge of its administration.

The general declared that whatever direction NRA may take, he strongly favors the Government keeping its veto power over code organizations. This statement was made in reply to a question as to his attitude toward turning the work of running industry over to a council of code authorities.

The commission proposed by General Johnson would be non-partisan. The administrator feels that it should consist of men experienced in NRA and would not include Federal Trade Commission members.

He would like to see the commission set up and ready to take up its work as soon as the basic code is put into effect. Under the plan industries not yet codified could merge with kindred codes; affiliate with their own basic codes or submit to the possible imposition of the code at hearings which it was stated would be held in 40 days, the latter classification including industries which "appear to be harboring abuse of labor."

The order also includes a long range plan for consolidation of all codes, those now in operation and those yet to be adopted, into the lowest possible number. NRA has suggested they may be reduced to 300, as against the some 480 now existing and the 262 which were pending when the order was issued. Among the latter were 135 industries on which hearings have been held or are in such a stage that agreement is regarded as near. Many of the 135 will adopt separate codes. A 15-day period was given them to do so.

Completion of code-making has been started by a committee selected by

General Johnson. It is headed by Robert K. Straus, special assistant to the administrator; Leon C. Marshall, former vice-chairman of the National Labor Board, and George S. Brady, assistant administrator for policy.

Terms of Remaining Codes Are General

Under the basic code plan hearings will not be necessary as the provisions offered for adoption have already received the sanction of the required administration and advisory groups. The basic code includes only such standards as wages, hours, right of collective bargaining, prohibition

of child labor, authorization for other fair trade practices and an open price policy, consistent with the new price policy recently announced by NRA, which prohibits the fixing of even minimum prices except in cases of emergency.

The basic code sets up a general NRA code authority to be created by the administrator. This code authority will be unlike other code authorities for it will be purely of governmental composition and of course under governmental jurisdiction. Hour and wage provisions in the basic code were left blank with the express provision that these be established at the figures carried in related codes.

Structural Steel Code is Approved But Institute Is Not Notified

WASHINGTON, July 17.—The long-delayed structural steel fabricating code has been approved by Gen. Hugh S. Johnson, to become effective July 22. The clause dealing with steel erection has been deleted in the approved code. However, it is provided that the Administrator, within 90 days, may direct a further hearing on such of the code's provisions as he may designate. It is also provided that any order by the Administrator after the hearing shall have the effect of a condition on his approval of the code.

Of the many changes in the code as originally presented, the chief one imposed directs that all provisions governing erection work shall be deleted, and that such erection work shall be governed by the provisions of the construction code. This was a point of heated debate and is the principal reason for the long delay in approving the code. Organized labor had insisted that the erectors' clause be struck out. The upshot is that fabricators lose jurisdiction over the steel and the job as soon as fabrication is completed. Erection work comes under the construction code with its strong dominance by organized labor.

Other changes directed by the Administrator serve to raise the originally proposed rates of pay for common labor in plants; establish a maximum work-week not subject to variation; prevent sale below a member's own cost; and amend the schedule of unfair trade practices.

As approved, the code provides that workers shall not be employed for more than 40 hr. in any one week, nor more than 8 hr. in any 24-hr. period, nor more than six days in any seven, except in cases of emergency when all overtime shall be paid for at the rate of time-and-one-third.

These restrictions, however, do not apply to those in a managerial or executive capacity who earn \$35 or more per week.

Employees engaged in drafting, detailing or designing are to be paid not less than at the rate of \$20 per week; and the minimum rate of pay per hr. for common labor in plants is established at 34c. in Hawaii and the southern States, with the minimum at 40c. per hr. in the remainder of the United States, Alaska and the Canal Zone.

Provision is made for modification of the code authority by the administrator if he shall find it is not "truly representative or does not in other respects comply with the provisions of the (Recovery) act." He may prescribe hearings to determine the representative character of the code authority.

It is also provided that none of the members of the industry shall sell or contract or offer to sell any product or do contract or offer to do erection work at a price which shall be less than the reasonable estimated cost of a member of the product or erection work. For the purpose of determining costs, a competent firm of public accountants is to be engaged 10 days after the code goes into effect, and, subject to review by the administrators, the firm will not later than two months from the effective date of the code report to the code authority a comprehensive estimating formula, including all direct and indirect charges. The report immediately upon approval of the administrator is to replace section one of the code and become the estimating formula for the industry.

One unfair trade practice added to the code since it was presented, bars purchasing below the advertised price of materials or accepting of rebates,

credits (secret or otherwise), waiving of extras or in any way purchasing materials below published prices. Another prohibits the shipping of materials by fabrication-in-transit privilege to a point other than actually specified on the orders to the rolling mills, though the use of the fabrication-in-transit privilege for the normal movement of stock materials is permissible.

The code provides for an 8-hr. day, 40-hr. week, except in emergencies. Common labor in Hawaii and the Southern States is to be paid 34c. per hour. For the remainder of the United States, Alaska and the Canal Zone the rate is 40c. an hour.

Inquiry by THE IRON AGE at the of-

fice of the American Institute of Steel Construction revealed the fact that this body, which has officially represented the structural steel industry throughout the code negotiations has been left completely in the dark with regard to these developments. It was not notified by the NRA even of the fact that the code had been signed, nor of the alterations that were made in it without the institute's committee's knowledge or consent. To date, it has not received even a copy of the code nor even the customary "press release" from NRA publicity headquarters. The newspaper reports of the signing of this code, which appeared last Friday, are said to have been based upon an interview given by an official of the A. F. of L.

New Industrial Board Can Recommend; Not Enforce

WASHINGTON, July 17.—To perform in somewhat the same fashion as did the abolished National Compliance Board, the new NRA three-man Industrial Appeals Board will be organized about Aug. 1. It will only have powers of recommendation, however, and, unlike the old compliance board, will not be authorized to assess penalties. Recommendations are to be made to the administrator, leaving to him what action should be taken.

The board to a large degree at least also replaces the recently abolished Darrow Recovery Review Board, stormy petrel whose career was marked by head-on collisions with NRA. The Darrow board's obsession was that codes have been used to oppress small enterprises and to create monopolies. It is interesting therefore that NRA's announcement of the new board, to be headed by Amos J. Peaslee, New York, says it will be "a forum for a hearing of all sorts of complaints against the operations of codes but particularly

those of small businesses that codes oppress or discriminate against them or favor monopolies." Distorted as were pictures of codes as drawn by the Darrow board, it concentrated on the very tasks that the new board is to take up.

The board will be organized early in August, and will occupy quarters in the Department of Commerce formerly used by the abolished National Labor Board.

Mr. Peaslee formerly was acting chief of the National Compliance Board. He is a member of the New York firm of Peaslee & Brigham, a graduate of Swarthmore College, Columbia University and Birmingham University in England. He was attached as major to General Pershing's headquarters in France and was director of the American Courier Service, served as judge advocate of the general court martial and, following the cessation of hostilities, was associated with the American Commission to Negotiate Peace.

Code Doings and Undoings

Codes for Secondary Steel Products

ADMINISTRATOR JOHNSON has approved the code of fair competition for the secondary steel products warehousing trade, but with the provision that the articles on hours, wages and general labor provisions shall be stayed for 25 days. At the termination of that period these articles will become effective unless he otherwise directs. Within that time cause may be shown why the provisions should not become effective. The Administrator added that in the meantime the members of the trade will comply with the corresponding provisions of the code

for the wholesaling and distributing trade. The code becomes effective July 23. The suspended hour and wage provisions establish a maximum 40-hr. week and provide for a minimum weekly wage of \$15. In this trade there are approximately 65 concerns with aggregate annual sales of \$35,000,000. About 3000 persons are employed.

Open-Hearth Flooring Codes

THE supplementary code for open steel flooring has been approved and adopts the wage, hour and labor provisions of the basic code, provides for code admin-

istration, and adopts the uniform rules for open price filing and not selling below cost in emergencies due to destructive price cutting. It becomes effective July 21.

Power Transmission

THE supplemental code of fair competition for the power transmission subdivision of the machinery and allied products industry has been approved. This subdivision covers the manufacture for the sale of flat belt pulleys, rope sheaves, couplings, collars, hangars, pillow blocks, journal boxes, clutches and other incidental machinery and appliances used in the transmission of power, but exclusive of shafting, multiple V-belt drives, belt- ing, cut gears, cut tooth and cast tooth sprockets, chains, speed reducers, and automotive parts, and includes all those engaged in such manufacture for sale. Employers otherwise engaged in the farm equipment industry may manufacture for sale and sell power take-off equipment used in connection with tractors and gear reduction devices for power take-off for farming machinery, under the provisions of the code of the farm equipment industry, and not under the provisions of this code. The wage provisions of the subdivision are similar to those of the code for the machinery and allied products industry under which it operates.

Soil Pipe Code Amendments

ADMINISTRATOR JOHNSON has approved an amendment to the code for the cast iron soil pipe industry as proposed by the code authority. The amendment provides that destructive price cutting is an unfair method of competition and is forbidden and the amendment further provides for the establishment of minimum prices during the period of emergency.

Floor Machinery Code

DISCUSSION of the insertion of clauses necessary to make the code as proposed conform to various recent office orders featured the hearing on the proposed code of fair competition for the floor machinery industry before Assistant Deputy Administrator Walter Mangum. A code authority is provided for, consisting of three representatives of the association and one non-member, if desired. Clauses were inserted providing for a uniform cost accounting system and banning selling below cost in an emergency.

Foundry Equipment

THE code authority of the foundry equipment industry has requested approval of a modification to its code which would permit the authority to incur, and bill members of the industry for, reasonable expenses incident to code administration. Notice was given that any criticisms of, objections to or suggestions concerning the proposed amendment must be submitted to Deputy Administrator Joseph Dilworth, Room 4036, Department of Commerce Building, prior to July 25.

Refractories

THE code authority for the refractories industry has made application to the NRA for approval of its budget for and the basis of contribution by its members toward the expense of administering it.

code. The total amount of the budget for the period from May 1, 1934, to April 30, 1935, is \$100,000. The basis of contribution is three-tenths of one per cent of total sales. A discount of 5 per cent is allowed members of the industry not members of the American Refractories Institute, relieving such industry members of the expense of one \$5,000 Refractories Fellowship at the Mellon Institute of Industrial Research. This fellowship is the only Institute activity not shared by the industry. Notice is given that any criticism of, objection to, or suggestion concerning this budget and the basis of contribution must be submitted to Deputy Administrator Joseph Dilworth, Room 4036, Department of Commerce Building, prior to July 23.

Die Casting

ALL objections to the proposed budget and schedule of contributions and request for an amendment permitting the submission of such a budget for the die casting code should be submitted at Room 4023, Department of Commerce Building, prior to July 25. The budget, designed to cover the 12-month period starting March 18, 1934, totals \$20,300. It is proposed that the industry should contribute one-fourth of one cent per hr. on all man hr. worked.

Saws and Steel Products

ALL objections to the proposed modification to the approved code for the saw and steel products manufacturing industry should be submitted in Room 4036, Department of Commerce Building, prior to July 26. The modification, as proposed, would permit the code authority to submit a proposed budget and schedule of contributions, by the industry to the Administrator for his approval, and makes failure to contribute as prescribed a violation of the code.

Polishing Wheel Industry

THE buff and polishing wheel industry, through its code authority, has made application for approval of a proposed modification of the code of fair competition of that industry which will enable the code authority to prepare a budget and a basis of contribution of members, for the expense of administering the code. Any criticisms of, objections to, or suggestions concerning the proposed modification must be filed in Room 4026, Department of Commerce Building, prior to July 20.

Packaging Machinery

A HEARING on proposed amendments to the approved code for the packaging machinery industry and trade will be conducted by Deputy Administrator Joseph Dilworth, July 26, in Washington. The amendments, sponsored by the code authority, would change the definition of "Industry" and alter both the minimum wage and maximum hour provisions of the code as approved. The change in the definition is made as the result of the working of the code for the past eight months.

Manganese Industry

THE National Recovery Administration has issued an order recognizing the following as members of the code authorities for the following industries: Manganese Industry: members of the execu-

tive committee of the American Manganese Producers Association; J. Carson Adkerson, Washington; H. A. Pumpelly, Domestic Manganese & Development Co., Oswego, N. Y.; James W. Gerard, New York; A. J. Seligman, Butte Copper & Zinc Co., New York; D. H. McCloskey, New York; and these non-members of the executive committee: W. B. Daly, Anaconda Copper Mining Co., Butte, Mont.; John H. Cole, Domestic Manganese & Development Co., Butte; L. L. Savage, U. & S. Mining and Development Co., New York, and John Rickey, Moorlight Mining Co., Phillipsburg, Mont.

Foundry Supplies

DEPUTY ADMINISTRATOR J. G. COWLING has announced that all objections to the proposed \$18,000 budget for the support of the code authority for the foundry supply trade to cover the period from Feb. 20, 1934, to Feb. 28, 1935, should be filed with him in Room 4023 of the Department of Commerce Building, prior to July 26. The assessment is to be not in excess of one-half of one per cent of current sales which shall be reported monthly, billed for the second previous month and payable within 30 days. Code authority estimates that this assessment will provide only approximately 60 per cent of the budget. To meet this exigency, the Foundry Supply Manufacturers Association has agreed to assume and pay whatever deficit there may be.

Road Machinery—Plumbago Crucibles

ACTING DIVISION ADMINISTRATOR BARTON W. MURRAY has approved trade practice complaint committees for the road machinery manufacturing industry and for the plumbago crucible industry, the latter committee being comprised of the code authority. The following will act for the road machinery industry: W. R. Adams, vice-president, J. D. Adams Co., Indianapolis, Ind.; C. J. Foster, vice-president, Buffalo-Springfield Roller Co., Springfield, Ohio, and J. G. Miller, vice-president, Baker Manufacturing Co., Springfield, Ill.

The code authority for the plumbago crucible industry consists of the following: Chairman, J. H. Schermerhorn, vice-president, Joseph Dixon Crucible Co., Jersey City, N. J.; F. L. Armstrong, president, Vesuvius Crucible Co., Swissvale, Pa.; S. N. Clark, president, Chicago-Naugatuck Crucible Co., Shelton, Conn.; F. B. Danehower, president, Ross-Tacony Crucible Co., Tacony, Philadelphia; Furman South, Jr., president, Lava Crucible Co., Pittsburgh, and William P. Cook, administration member of the code authority, New York.

Aluminum Code Authority

MEMBERS of the code authority for the aluminum industry selected at an organization meeting in New York last Wednesday, and subject to final approval by the NRA, include four members from the Aluminum Co. of America and seven from independent aluminum fabricating companies. They are:

Bauxite Division: Theodore Wenzel, Charles Lenning & Co., Philadelphia, Pa.

Concentrates Division: George Ginsberg, United Smelting & Aluminum Co., New Haven, Conn.

Virgin Aluminum Division: Winthrop

C. Nielson, Republic Mining & Mfg. Co., New York.

Secondary Aluminum Division: Walter Wiel, Aluminum Research Institute, Chicago.

Extruded Shapes Division: Harry W. Holt, Bohn Aluminum & Brass Co., Detroit.

Forgings Division: Sam Simmons, Aluminum Co. of America, New York.

Foil Division: R. G. McKay, Reynolds Metal Co., Louisville, Ky.

Tubing, etc., Division: George J. Stanley, Aluminum Company of America, Pittsburgh.

Piston Division: H. J. Hater, Aluminum Industries, Inc., Cincinnati.

Aluminum Bronze Powder Division: I. W. Wilson, Aluminum Co. of America, Pittsburgh.

Aluminum Sheet Division: R. G. Farrell, Fairmont Aluminum Company, Fairmont, W. Va.

The officers are: George Ginsberg, United Smelting & Aluminum Co., New Haven, Conn., President; Sam Simmons, Aluminum Co. of America, New York, vice-president; Donald McDonald, Association of Manufacturers in Aluminum Industry, New York, secretary and treasurer.

Forged Tool Manufacturing Industry

FOLLOWING is the membership of the supplemental code authority of the forged tool manufacturing industry as approved by the NRA: John A. Moore, Warwood Tool Co., Wheeling, W. Va.; A. C. Laessig, Woodings-Verona Tool Works, Verona, Allegheny County, Pa.; Paul W. Frum, Warren Tool Corp., Warren, Ohio, and G. H. Story, Stanley Rule & Level Plant, New Britain, Conn.

Bakery Equipment

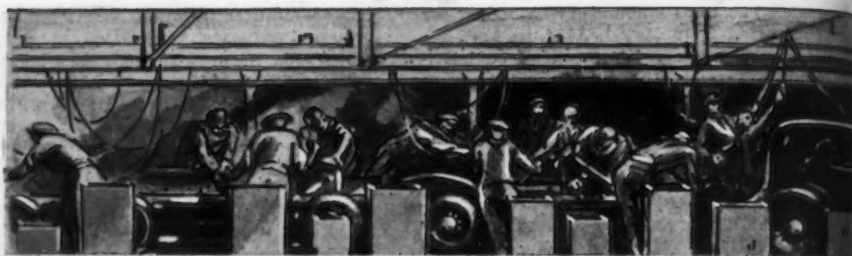
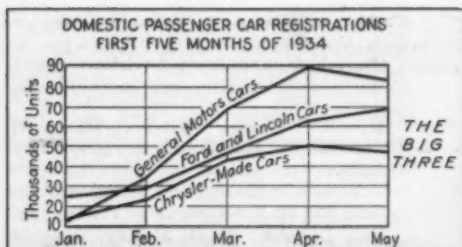
APPROVAL has been given of a code for the bakery equipment manufacturing industry, as a supplement of the approved code for the machinery and allied products industry. The code, which becomes effective July 24, adopts the wage, hour and labor provisions of the basic code, and provides for code administration through a supplementary code authority of five persons, one of whom must be a representative of the members of the industry not members of the Bakery Equipment Manufacturers Association.

Elevator Division of Construction Industry

PROVISIONAL approval of the budget and basis of contribution submitted by the code authority of the elevator manufacturing division of the construction industry has been given.

G., M. & N. RR. Will Buy 2150 Tons of Rails

WASHINGTON, July 17.—A PWA contract for a loan of \$255,000 to the Gulf, Mobile & Northern railroad has been signed and will be partly used for the purchase of 2150 tons of rails. This was the third loan contract made with the G., M. & N. railroad. A fourth contract covering a loan of \$519,000 for the purchase of new cars and engines is in course of preparation.



THIS WEEK ON THE

Dealers Have Only Normal Stocks, Despite High Production Rate

DETROIT, July 17.

WITH midsummer at hand and figures available for the first half of the year, it is perhaps well to examine the position of the automobile industry as it heads into what is usually a slow season. Production in the first six months of 1934 amounted to 1,802,442 units, according to the estimate of the National Automobile Chamber of Commerce. This included Canada as well as the United States.

Domestic passenger car registrations from January to May inclusive totaled 771,479 units, and June is put at 215,000 units by R. L. Polk & Co. Thus passenger car sales in the United States up to June 30 of this year were 986,479 units. Commercial car and truck registrations for the same period amounted to 197,986 units, raising domestic sales of all motor vehicles to 1,184,465 units.

If 84,000 units made in Canada and 132,000 units for export are subtracted from the total assemblies of 1,802,442 units, one finds that 1,586,442 cars and trucks were built for the domestic market during the first half of 1934. Of that number 1,184,465 units have been registered. This leaves 401,977 units to account for.

Dealers Average Eight Cars Each

Probably 7000 units were bought by the Federal Government and did not appear among registration figures. Then it can be figured that about 100,000 cars were in transit from factories to dealers. This leaves, at the end of June, 295,000 units in the hands of 37,000 dealers throughout the country or an average of eight cars per dealer.

In view of the fact that most makers have several lines of cars, an average stock of eight cars per dealer is not high. The larger dealers need more than that and the smaller ones less. A prominent low priced car maker estimates that its larger dealers must have at least 15 cars in order to function efficiently.

That the stocks now in the field are unevenly distributed is shown by the statement of one company that its dealers in the larger cities are short of cars, while it is generally known that three companies have excessive stocks in dealers' hands. An overall survey, however, reveals a healthy condition and there is not likely to be a repetition of the experience of two and three years ago when certain makers' warehouses were full of discontinued models.

Leading car makers, and particularly Plymouth, are said to have reduced their production schedules for July. However, Ford, Chevrolet and Plymouth together are planning on assembling about 210,000 units. Total production in the industry should aggregate from 265,000 to 270,000 units, or approximately 15,000 under earlier estimates.

General Motors Buys Steel

The stocking of steel during June has not brought steel buying to a halt, the tonnage this month having been larger than anticipated. The steel trade was somewhat enlivened the past week by orders from Chevrolet, Fisher Body and Oldsmobile. Chevrolet releases were in the nature of an evening up of steel items for August production. It is said that Chevrolet will make one more steel buy for current models. This is taken as an

indication that assemblies of 1934 cars will continue through September. If this program holds, Chevrolet probably will not be ready to announce its 1935 line until December.

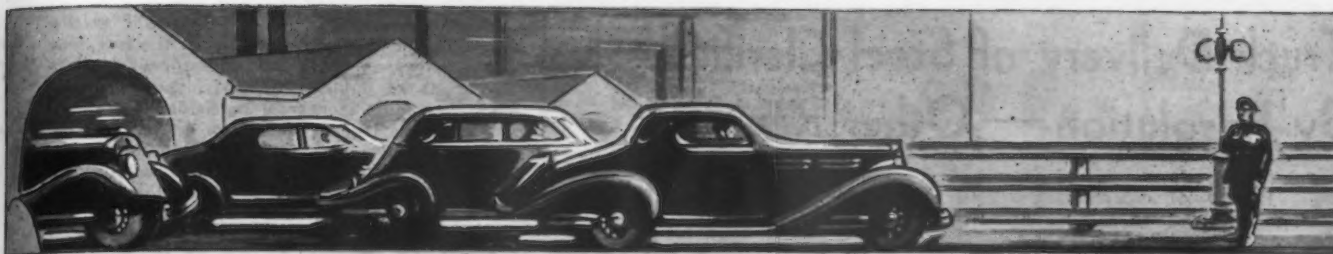
Oldsmobile's steel purchases were for August and September production. The Olds plant at Lansing is operating at full capacity to meet demands for the six and eight. Oldsmobile was later than any other General Motors division in getting under way this year. Its assemblies this month should be close to 12,000 units.

Buick the past week assembled 456 cars a day, the final assembly line operating on a single shift five days a week. The Buick foundry is working on two shifts daily and the forge division on three shifts. Buick employed an average of 14,359 men during June.

Pontiac Pushing Suppliers

Pontiac is understood to be pushing machinery builders for delivery of equipment for its new six prior to Sept. 1. This car, the first to be offered for 1935 by General Motors divisions, will not be out before October. The Pontiac eight definitely will be continued, despite reports to the contrary. Pontiac is said to be particularly engaged in the task of building up its dealer organization for the handling of exclusive Pontiac sales apart from any hook-up with Buick.

Packard has officially confirmed the facts first published in this column on June 14, that its factory is being divided into two separate plants, in one of which the smaller car will be built. In recent months Packard has added 90 men to its engineering department to do work on this car, rais-



ASSEMBLY LINE

ing its total engineering staff to 425 men. Among the men well known in the industry who have been added to Packard's organization are E. R. Smith, Erwin L. Bare, E. A. Weiss, Edwin H. Johnson and Charles M. Lejuste, all of whom have been identified with the production and design of smaller cars. Packard will announce shortly the appointment of several new executives to its manufacturing staff who will be engaged largely on production of the new car. A separate sales organization is being set up for the lighter job, which probably will not be ready for public introduction until Jan. 1.

Packard has not been crossed off the list of prospective machine tool purchasers. There has been much speculation whether it will confine its equipment program to the rebuilding of old tools or will buy modern machinery on a large scale. Opinion is leaning more toward the belief that new machine tools will be ordered in considerable numbers, but no action is expected for another 30 days.

Uncertain Outlook Holding Back Equipment Buying

Although the machine tool trade is optimistic, it is resigned to the fact that purchases of new equipment for 1935 cars will be far less than indicated a month ago. Two reasons are assigned for this change of heart on the part of the industry, one reason being contingent on the other. The main factor apparently is that leading car manufacturers cannot see their way clear to expend vast sums for equipment when so much uncertainty still exists regarding the Federal Government's future policies. The secondary factor, arising out of the first, is that mechanical changes in practically all cars next year will be negligible. An example: Plymouth and Dodge are reported to have considered seriously new motors which would require installation of new machine tools. This has been abandoned in favor of continuation of present motors with slight changes.

Chevrolet's prospective expenditures for new equipment are not considered bright at the moment. It is reported probable that it will expand somewhat its facilities at Flint for

By **BURNHAM FINNEY**
Detroit Editor, **THE IRON AGE**

manufacture of motors for its Standard line for next year, but this will not necessitate the placing of large equipment orders. Hopes are fading that Ford will buy much new machinery for the Rouge plant. Olds is practically out of the market for machine tools for next year.

Trend Is Toward Streamlining

It is reported that the Chrysler and De Soto Airflow cars will be continued with virtually no change in design. The big changes in 1935 models will be in body design, with General Motors probably taking the present LaSalle as its objective and the Chrysler divisions swinging over toward a modified Airflow. The main problem with which the Chrysler executives are understood to be grappling at present is how far they should go toward the Airflow type with the Plymouth, Dodge and Chrysler six cars. The question is how much the public is sold on streamlining.

With the trend toward the LaSalle, General Motors is likely to alter its method of making front fenders. The LaSalle front fenders are made in three pieces, the nose, the center section and the rear section. These pieces are welded together. It is reported probable that the front fenders of the new Oldsmobile and Pontiac will differ somewhat in design from the LaSalle and may be made in two pieces longitudinally welded into a single piece. The front fenders for these cars this year are made from a single steel sheet.

While expenditures for body dies for 1935 will be large because of changed designs, an economical practice introduced this year is expected to be continued. This practice consists of making dies for such parts as body quarter panels and using interchangeable inserts for the molding or beading. This makes possible the use of the same die by a manufacturer for two lines of cars, avoiding the

expense of making an extra set of dies.

Leaf spring makers are pushing aggressively their new independent springing system using leaf springs, but it is believed that both Chrysler and General Motors are definitely committed for 1935 to their present knee-action system employing coil springs, possibly with a few minor changes. In the tooling up process at Chrysler's Newcastle, Ind., plant, it is understood that work is proceeding on the basis of a continuation of the present coil springing system. Indications are that manufacturers are shying away from extension of independent springing to rear wheels.

Official announcement may be made soon of a streamline car with engine in the rear developed by a company in the Detroit district. This car departs in every way from traditional design. All four wheels are independently sprung with coil springs. It comfortably seats eight people in pivotal chairs arranged so that passengers can move about as they would in a launch. The car, which is unusually light, operates easily at speeds of 90 to 100 m.p.h. It is likely that it will be air-conditioned by a simple but effective system.

Detroit Notes

The Fisher Body Corp'n. is said to be preparing to reopen its press department at its Pontiac plant, which has been closed this year. Some of the work done at Fisher's Cleveland plant may be transferred there. . . . The Hudson factory shipped 65,810 cars in the first half of 1934, as against 23,002 in the corresponding period in 1933. . . . The McCord Radiator & Mfg. Co., Detroit, is the exclusive licensee in the United States, by arrangement with the Shell Oil Co., for manufacture of a refrigerating and air-conditioning system for trucks and passengers cars which uses Petrogas, or propane, as the fuel. This fuel acts as a refrigerant and likewise propels the car. . . . An example of what installation of modern machine tools will do: a car maker which recently put in new equipment has cut its engine production costs below that of another company with nine times the volume.

Truck Delivery of Steel Clarified By Resolution — Other Revisions

REVISION of commercial resolution No. A3, having to do with deliveries of steel products by truck to places not reached by all-rail transportation, has been announced by the directors of the American Iron and Steel Institute, effective July 19. The changed resolution provides that:

(1) Except as otherwise provided in paragraph (4) hereof, in any case in which any purchaser of concrete reinforcing bars shall require delivery thereof at a place at which delivery thereof cannot be made by all-rail transportation and delivery thereof at such place shall be made by truck, the member of the code which shall sell or contract for the sale of such product to such purchaser for delivery at such place shall add to the delivered price of such product otherwise chargeable pursuant to the provisions of section 4 of schedule E of the code and of the regulations prescribed by, and the resolutions adopted by, the board of directors thereunder and then in effect for delivery at the nearest point to such place at which such product could be delivered by all-rail transportation an amount which shall be not less than \$2 per ton of such product so delivered;

(2) Except as otherwise provided in paragraph (4) hereof, in any case in which the purchaser of any product (other than concrete reinforcing bars) shall require delivery thereof at a place which is within the switching limits of any city or town and at which delivery thereof cannot be made by all-rail transportation and delivery thereof at such place shall be made by truck, the member of the code which shall sell or contract for the sale of such product to such purchaser for delivery at such place shall add to the delivered price of such product otherwise chargeable pursuant to the provisions of section 4 of schedule E of the code and the regulations prescribed by, and the resolutions adopted by, the board of directors thereunder and then in effect for delivery at the nearest point to such place at which such product could be delivered by all-rail transportation an amount which shall be not less than 50c. per ton of such product so delivered;

(3) Except as otherwise provided in paragraph (4) hereof, in any case in which any purchaser of any product (other than concrete reinforcing bars) shall require delivery thereof at a place which is not located within the switching limits of any city or town or at any place in the City of New York and delivery thereof at such place cannot be made by all-rail transportation and delivery thereof at such place shall be made by truck, the member of the code which shall sell or contract for the sale of such product to such purchaser for delivery at such place shall add to the delivered price of such product otherwise chargeable pursuant to the provisions of section 4 of schedule E of the code and of the regulations prescribed by, and the resolutions adopted by, the board of directors thereunder and then in effect for delivery at the nearest point to such

place at which such product could be delivered by all-rail transportation an amount which shall be not less than \$1 per ton of such product so delivered;

(4) If pursuant to the published freight tariffs of any railroad company, on the shipment of a less-than-carload quantity of any product from the plant of any member of the code for the production of such product or from a warehouse of any member of the code for such product to any railroad freight station in Kentucky (not including any railroad freight station at any place located on the Ohio River) or in Tennessee, Mississippi, Alabama, Georgia, North Carolina, South Carolina, Arkansas, Louisiana, Texas, Oklahoma, Kansas, Colorado or New Mexico or in that part of Missouri along or south of the Missouri River and west of but not located on the Mississippi River, such railroad company will cause such product to be delivered to any place other than such railroad freight station for the same all-rail published tariff freight charges that would apply, if such product were delivered at such railroad freight station, then any member of the code which shall sell such product in a less-than-carload quantity and shall ship such product in pieces or packages of dimensions and weights such as would be so delivered under the aforesaid published freight tariffs for delivery at such place may deliver such product or cause it to be delivered at such place without making the additional charge hereinbefore in paragraph (1), (2) or (3) provided on account of the transportation of such product from such railroad freight station to such place;

(5) If pursuant to the published freight tariffs of any railroad company on the shipment of a less-than-carload quantity of any product from the plant of any member of the code for the production of such product or from a warehouse of any member of the code for such

product to any railroad freight station in the territory described in the foregoing paragraph (4) an allowance from the all-rail published tariff freight charges on such shipment will be made, if the consignee thereof shall take delivery thereof at such railroad freight station, and, if any member of the code shall sell such product to any purchaser in a less-than-carload quantity and shall ship such product in pieces or packages of dimensions and weights to which such allowance would apply under the provisions of the aforesaid published freight tariffs for delivery at such place shall add to the delivered published railroad freight tariff applicable to the shipment of such product from the plant or warehouse of such member from which such product shall be shipped to such railroad freight station shall not provide for a similar allowance, then such member of the code may allow to such purchaser a reduction in the delivered price for such product otherwise chargeable pursuant to the provisions of section 4 of schedule E of the code and of the regulations prescribed by, and the resolutions adopted by, the board of directors thereunder and then in effect and properly applicable to the sale of such product in an amount which shall not be greater than the amount of such allowance, but only if such purchaser shall take delivery of such product at such railroad freight station.

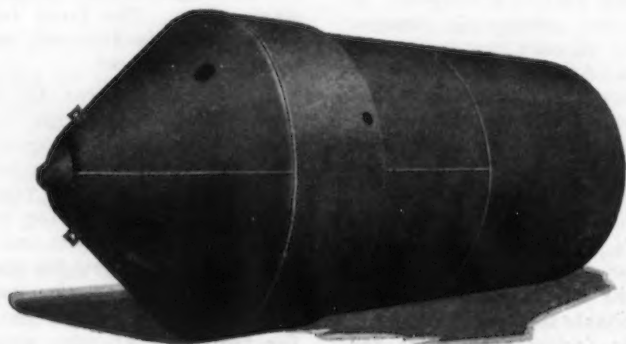
A change in resolution A21 has also been approved by the directors of the institute and is effective July 19. This provides that the deduction of 7½c. a 100 lb. allowed on bars, sheets and strip steel for delivery at Mahoning Valley points and at Sharon and Sharpsville, Pa., shall be made from the freight tariff from Pittsburgh only instead of from any basing point as provided in the original resolution.

Commercial resolution No. A29 supersedes the old resolution No. 47, adopted Feb. 2, and expires on Dec. 31, 1934. It provides that until a base price for pig iron at Granite City, Ill., shall have been filed with the institute, sellers of iron in the Granite City territory shall be permitted to deduct \$2 a ton from the Chicago base price in quoting prices for delivery in that area.

Stainless Clad Steel Used for Bleach Tank

THE 20,000-lb. capacity C.P. bleach tank here pictured, recently installed in the plant of a large Midwestern manufacturer of soap for use in the refining of glycerin, is made of all-welded Ing Aclad steel fur-

nished by the Ingersoll Steel & Disk Co., Chicago, a division of the Borg Warner Corp'n. The vessel, fabricated by the Hamler Boiler & Tank Co., Chicago, has a water-jacketed conical bottom, and measures 6 ft. in diameter and 13 ft. in length. The clad steel used for the shell and bottom is ¼ in. thick and that for the water jacket is 3/16 in. thick. All joints were ground after welding.



Steel Production Rises to 28 Per Cent With Gains in Three Districts

Output Is Lower in Birmingham and Valley Districts—Price Uncertainty and Labor Unrest Accentuate Seasonal Lull

SEASONAL inactivity in the steel industry has been accentuated this week by increased uncertainty regarding the labor situation and renewed unsettlement in the finished steel price structure. While ingot production in the country as a whole has risen one point to 28 per cent of capacity, increases have not been general in the principal districts. Finishing mill schedules, being dependent almost entirely upon immediate consuming requirements, are also very spotty.

Steel production is unchanged in the Pittsburgh, Philadelphia, Wheeling and Detroit districts, although replenishment of raw steel inventories in many plants is reported. Detroit output is sustained at capacity by the steady requirements of nearby automotive plants. The operating rate has risen five points to 33 per cent at Chicago, two points to 30 per cent in the Valleys and 10 points to 25 per cent at Buffalo. In the Cleveland-Lorain territory, output is two points lower at 32 per cent, while production at Birmingham has dropped 15 points to 25 per cent coincident with the closing down of the rail mill.

MARKET interest is still focused on the future, even though orders for sheets and tin plate are holding up better than had been anticipated. The automobile industry has placed some business in the last week and is expected to have covered its entire requirements for present models by the end of the month. Orders for the production of 1935 cars could not affect steel production schedules before September and probably not until the fourth quarter.

STRUCTURAL steel awards this week declined to 8500 tons from 20,300 tons in the previous period. New projects also continue light, calling for 10,400 tons, as compared with 7500 tons in the preceding week and 9000 tons two weeks ago. The volume of prospective work, however, is steadily increasing. In the New York district alone, at least 150,000 tons of steel is expected to be placed before the end of the year for a few large jobs.

The PWA has allotted \$57,000,000 for dam construction alone, most of which will supplement previous awards. Approximately 40,000 tons of sheet steel piling is pending for this work in addition to 15,000 tons awarded last week for the Fort Peck, Mont., dam. The Department of the Interior has awarded 5500 tons of reinforcing bars for Boulder dam.

RECENT price reductions and the current uncertainty regarding the maintenance of present levels offer little incentive to immediate purchases. The filing last week of \$1 a ton reductions on hot-rolled annealed and hot-rolled, pickled-in-the-breakdown,

annealed, deoxidized sheets, to become effective at Pittsburgh on July 20, unsettled the sheet market considerably. These grades had been reduced \$4 a ton only two weeks before and consumers are watching the market carefully for additional changes.

Price revisions during the last three weeks have offered conclusive proof of the fact that the code is not a price-fixing medium. Both of the recent reductions in sheets were filed with the industry's code authority by individual mills and came as complete surprises to the other producers. They were met with reluctance in most instances and indicate very clearly that the code would be powerless to prevent a rapid decline in prices if any one producer felt that prospective tonnage might be encouraged.

WHILE the recent executive order permitting price reductions on Government-financed projects has been partially clarified, it is still a disturbing factor. Even though lower quotations made to the Government need not be extended to the trade, private buyers are not expected to submit willingly to such discrimination. While the steel industry has not been exempted from the ruling, producers emphasize the fact that the order is permissive and that they are being entirely consistent with their contractual relations under the code in quoting the usual filed prices on all business. In the meantime, the Department of Agriculture is holding up awards on a tonnage of steel wire products on which identical bids were submitted prior to the issuance of the President's order.

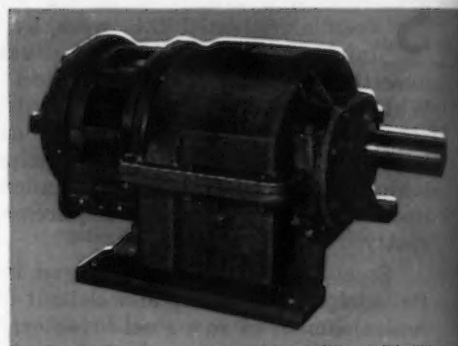
THE general strike at San Francisco is having little immediate effect upon the steel industry except as it influences business sentiment generally. Mills in the Pacific Coast area continue to move material by rail, although shipments by truck and water have entirely ceased. The stoppage of construction activity includes the San Francisco-Oakland bridge to which structural steel has been moving steadily for several months.

Sudden approval by the NRA of the structural steel fabricating code, with the section covering erection entirely eliminated, created another labor problem. The approved code is not believed to be satisfactory to the fabricating industry because it transfers all control of steel erection to the union-dominated construction code.

With the reduction in hot-rolled annealed sheets not yet effective, THE IRON AGE composite price for finished steel is unchanged at 2.131c. a lb. The pig iron composite continues at \$17.90, while the scrap composite is holding at \$10.58 in spite of a softer tendency in most markets.

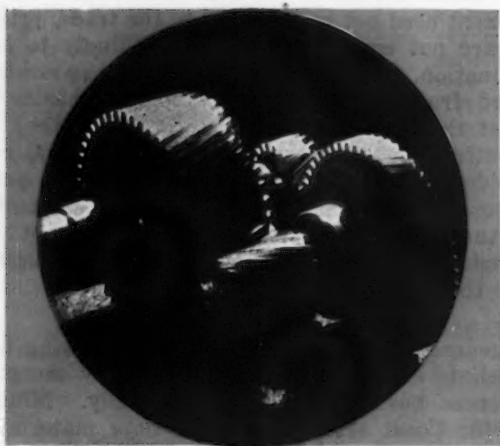
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This unit rating, design and manufacture... we call it "Unitary Power"... enables Westinghouse gearmotors to take loads up to the peak capacity of the motor. Also, the usual restrictions on overhung

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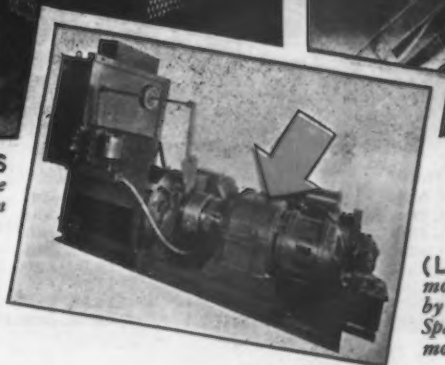
STEEL MILL CONVEYORS—The Type D Westinghouse Gearmotors driving this furnace conveyor are fan-cooled and totally-enclosed to furnish protection from dust and dirt.



(Above) COMPRESSORS—This 5-hp. Westinghouse Type S Gearmotor drives an engine-room compressor.



CRANES—Considerable space and weight are saved by the two Westinghouse Type D Gearmotors driving this crane in a large manufacturing plant.



(Left) HOISTS—Both hoist and trolley motions of this hoisting machine are driven by Westinghouse Type FD Gearmotors. Space economy and simplicity of gearmotors are of particular advantage here.

(Below) DOING A DOUBLE JOB—This fan-cooled $7\frac{1}{2}$ hp. Westinghouse Gearmotor drives both an elevator and a malt mill in a large brewery. The slow-speed end drives the elevator.



▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	July 17, 1934	July 10, 1934	June 19, 1934	July 18, 1933
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$17.34
No. 2, Valley furnace.....	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti.....	19.13	19.13	19.13	17.61
No. 2, Birmingham†.....	14.50	14.50	14.50	13.00
No. 2 foundry, Chicago*.....	18.50	18.50	18.50	17.00
Basic, del'd eastern Pa.....	19.76	19.76	19.76	17.09
Basic, Valley furnace.....	18.00	18.00	18.00	16.00
Valley Bessemer, del'd P'gh.....	20.76	20.76	20.76	18.89
Malleable, Chicago*.....	18.50	18.50	18.50	17.00
Malleable, Valley.....	18.50	18.50	18.50	16.50
L. S. charcoal, Chicago.....	24.04	24.04	24.04	23.17
Ferromanganese, seab'd car- lots.....	85.00	85.00	85.00	\$2.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

	July 17, 1934	July 10, 1934	June 19, 1934	July 18, 1933
<i>Per Lb.:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.45	2.45	2.65	2.25
Hot-rolled annealed sheets, No. 24, Gary.....	2.55	2.55	2.75	2.35
Sheets, galv., No. 24, P'gh....	3.10	3.10	3.25	2.85
Sheets, galv., No. 24, Gary....	3.20	3.20	3.35	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	2.00	1.65
Hot-rolled sheets No. 10, Gary	1.95	1.95	2.10	1.75
Wire nails, Pittsburgh.....	2.60	2.60	2.60	2.10
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.15
Barbed wire, galv., P'gh....	3.00	3.00	3.00	2.60
Barber wire, galv., Chicago dist. mill.....	3.05	3.05	3.05	2.65
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$4.25

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$11.75	\$11.75	\$11.75	\$13.25
Heavy melting steel, Phila....	10.50	10.50	10.50	10.75
Heavy melting steel, Ch'go....	9.50	9.50	9.75	10.75
Carwheels, Chicago.....	9.50	9.50	9.75	10.50
Carwheels, Philadelphia.....	12.50	12.50	12.50	12.75
No. 1 cast, Pittsburgh.....	12.25	12.25	12.25	11.25
No. 1 cast, Philadelphia.....	11.75	11.75	12.25	12.25
No. 1 cast, Ch'go, (net ton)....	8.50	7.25	7.50	10.50
No. 1 RR. wrot., Phila.....	11.25	11.25	12.25	10.75
No. 1 RR. wrot., Ch'go, (net)	7.25	7.25	7.50	9.00

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.85	\$3.85	\$3.85	\$2.50
Foundry coke, prompt.....	4.60	4.60	4.60	3.00

Metals

<i>Per Lb. to Large Buyers:</i>				
Electrolytic copper, refinery†	8.75	8.75	8.75	8.75
Lake copper, New York†.....	9.12½	9.12½	9.12½	9.00
Tin (Straits), New York.....	51.95	51.87½	51.25	48.00
Zinc, East St. Louis.....	4.30	4.35	4.20	5.00
Zinc, New York.....	4.65	4.70	4.55	5.37
Lead, St. Louis.....	3.60	3.60	3.85	4.35
Lead, New York.....	3.75	3.75	4.00	4.50
Antimony (Asiatic), N. Y....	8.12½	7.75	7.90	7.50

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$36.37½	\$36.37½	\$36.37½	\$40.00
Light rails, Pittsburgh.....	35.00	35.00	35.00	30.00
Rerolling billets, Pittsburgh.	27.00	27.00	29.00	26.00
Sheet bars, Pittsburgh.....	28.00	28.00	30.00	26.00
Slabs, Pittsburgh.....	27.00	27.00	29.00	26.00
Forging billets, Pittsburgh....	32.00	34.00	34.00	31.00
Wire rods, Pittsburgh.....	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.70	1.70	1.70	1.60

Finished Steel

<i>Per Lb.:</i>				
Bars, Pittsburgh.....	1.80	1.80	1.90	1.60
Bars, Chicago.....	1.85	1.85	1.95	1.70
Bars, Cleveland.....	1.85	1.85	1.95	1.65
Bars, New York.....	2.13	2.13	2.23	1.95
Plates, Pittsburgh.....	1.80	1.80	1.85	1.60
Plates, Chicago.....	1.85	1.85	1.90	1.70
Plates, New York.....	2.03	2.13	2.13	1.598
Structural shapes, P'gh.....	1.80	1.80	1.85	1.60
Structural shapes, Chicago.....	1.85	1.85	1.90	1.70
Structural shapes, New York	2.05¼	2.10¼	2.10¼	1.86775
Cold-finished bars, P'gh.....	2.10	2.10	2.10	1.70
Hot-rolled strips, P'gh.....	1.85	1.85	2.00	1.60
Cold-rolled strips, P'gh.....	2.60	2.60	2.80	2.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. †Blue Eagle copper.

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

July 17, 1934
One week ago
One month ago
One year ago

2.131c. a Lb.
2.131c.
2.199c.
1.953c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	HIGH	Low
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$17.90 a Gross Ton
17.90
17.90
15.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	Low
1934.....	\$17.90, May 1;	\$16.90, Jan. 27
1933.....	16.90, Dec. 5;	13.56, Jan. 3
1932.....	14.81, Jan. 5;	13.56, Dec. 6
1931.....	15.90, Jan. 6;	14.79, Dec. 15
1930.....	18.21, Jan. 7;	15.57, Dec. 16
1929.....	18.71, May 14;	18.21, Dec. 17
1928.....	18.59, Nov. 27;	17.04, July 24
1927.....	19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$10.58 a Gross Ton
10.58
10.67
11.58

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	Low
1934.....	\$13.00, Mar. 13;	\$10.58, July 10
1933.....	12.25, Aug. 8;	6.75, Jan. 3
1932.....	8.50, Jan. 12;	6.42, July 5
1931.....	11.33, Jan. 6;	8.50, Dec. 29
1930.....	15.00, Feb. 18;	11.25, Dec. 9
1929.....	17.58, Jan. 29;	14.08, Dec. 3
1928.....	16.50, Dec. 31;	13.08, July 2
1927.....	15.25, Jan. 11;	13.08, Nov. 22

Steel Output Sustained In Pittsburgh District



Valley Production Rate Rises to 30 Per Cent, With Wheeling District Unchanged—Sheet Releases Are Heavier

PITTSBURGH, July 17.—Third quarter steel backlogs have not been expanded to encouraging proportions thus far in July. In the past week the general run of orders was too restricted to effect an appreciable change in steel output. Consumers are naturally well covered ahead by second quarter deliveries, and spot business reflects some hesitancy on the part of buyers to purchase in the face of an unsettled price situation invited by the new code provisions. Possible recent exceptions have been the placing of some surprisingly good orders for sheets, and a fair flow of specifications for tin plate.

The heavy hot-rolled products, however, are comparatively neglected. Structural steel is moving rather slowly, although some fabricating units are well engaged on contracts placed some time ago. Plate mill order books are considerably depleted, with prospects for improvement obscure. Railroad business, including rails and track accessories, will be largely cleaned up by the middle of next month. Tubular mills continue to be engaged chiefly on stock production. Sheet mill operations this week will average about 24 per cent, while tin plate production continues at a strong 50 per cent.

No. 24 gage hot-rolled annealed sheets and No. 24 gage hot-rolled, pickled-in-the-breakdown, annealed, deoxidized sheets will be reduced \$1 a ton on July 20, establishing these grades at 2.40c. and 2.80c., Pittsburgh.

Raw steel output in the Pittsburgh district this week is unchanged at 18 per cent. A minor increase of two points has boosted operations in the Valleys and nearby northern Ohio mills to 30 per cent. Output in the Wheeling district continues at 35 per cent of capacity. Prospects for a sharp upswing from the present levels of production are somewhat vague. Heavy assemblies in the automotive industry this month are expected to drive in some steel tonnage, while impending production on 1935 models is stimulating hopes of gradual improvement in steel buying later on in third quarter.

The raw materials markets are featureless, with scrap prices nominally unchanged. Warehouse prices have been reduced in line with the lowering of mill quotations.

Pig Iron

Foundry melt offers no evidence of expanding this month, and shipments are correspondingly slow. Despite the lack of activity in this market, producers appear to be adamant in their ideas of prices. There is virtually no talk of reducing current quotations, which have not yet received the test of active buying. Only one merchant furnace is being operated in this district.

Semi-Finished Steel

Rerolling billets, blooms and slabs are now uniformly established at \$27, and sheet bars at \$28, Pittsburgh and Youngstown. Alloy billets, slabs and ingots have likewise been established at \$49, Pittsburgh. Forging quality billets, blooms and slabs have been adjusted lower to maintain the usual differential between rerolling quality. Replenishment buying by non-integrated mills is on a very moderate scale.

Rails and Track Accessories

The local rail mill is spreading its production as long as possible, and will probably complete its commitments by the middle of August. Other activity in this district on track accessories is at a low point. New business is confined almost entirely to miscellaneous needs.

Bars

Although demand since the close of last quarter has naturally been extremely light, improvement is expected toward the close of July. Heavier production schedules this month in the motor car industry will probably stimulate an increasing demand for bars later on.

Reinforcing Bars

Fresh specifications are featureless. A large aggregate tonnage of bar pends for dam construction. The heaviest outstanding work is for the

Bonneville Dam power house, which will take 12,000 tons; the Columbia Construction Co. is low bidder on the general contract. There is an almost complete absence of sizable private projected construction.

Cold-Finished Steel Bars

Demand is rather depressed, but sellers predict an upturn in buying after the current month. Early improvement, however, will probably rely mainly upon heavier consumption in the automotive field. In some districts shipments out of warehouses have not fallen as sharply in July as had been expected, and some jobber buying for replenishing stocks is therefore believed to be imminent. On the whole, however, both consumer and jobber inventories are still pretty well fortified by heavy takings early in the year.

Plates and Shapes

Plate mill backlogs are very slim, with no prospects of early expansion. New specifications are of a miscellaneous character and deflect a definite dwindling of activity in major plate consuming lines. The Pittsburgh base of 1.80c. a lb. is now uniformly established.

Structural business in the past week was disappointing, both as to awards and inquiries. Structural mills in this district are operating at greatly reduced schedules, while fabricating units are relying largely on backlog tonnage accumulated some months ago.

Tubular Products

Mill operations continue to be based almost entirely on stock production. New orders at the recently established lower base discounts are very limited, although protective buying in second quarter against higher prices probably augmented consumer stocks to abnormal proportions. In some cases, however, current inventories are believed to be sufficient only to carry consumption through the present quarter. In the case of oil country goods, a fair demand is expected to continue, only a few of the large interests having stocked heavily. Standard pipe is showing no definite trend, while an expansion in demand for mechanical tubing is in prospect later on this month.

Sheets

An unexpected spurt in miscellaneous sheet orders was reported in the past week. The diversified character of this new business suggests the tendency of some consumers to round out stocks with certain sizes and grades that had not been built up during second quarter. Although some tonnage from the automotive industry is in evidence, buying in that quarter continues to be very re-

stricted. General consumption is believed to be running well ahead of production, which this week will average about 24 per cent for the sheet industry. The filing of Pittsburgh prices of 2.40c. on No. 24 gage hot-rolled annealed sheets, and 2.80c. on No. 24 gage hot-rolled, pickled-in-the-breakdown, annealed, deoxidized sheets, will establish the market on these grades \$1 a ton lower on July 20.

Wire Products

Specifications against third quarter contracts are very limited. Wire mill backlogs and the current volume of new business are sufficient to support average operations of only 20 to 25 per cent. A pick-up in demand from the automotive industry is in prospect some time this month, but the outlook in other directions is very uncertain, and offers little hope for an early improvement.

Tin Plate

Operations for the tin plate industry appear to be resisting an expected decline. Output in the current week is at a strong 50 per cent. There are no definite indications, however, that this rate will be sustained. Some producers report a falling off in specifications, while others have recently enjoyed more generous releases. The forward outlook, however, is almost certain in that specifications will dwindle during the remainder of the summer. The current base price of \$5.25, Pittsburgh, is well maintained, with no indications of a revision in sight.

Strip Steel

Reduced quotations are now uniformly in effect. Hot-rolled strip is quotable at 1.85c., and cold-rolled strip at 2.60c., Pittsburgh. Truck fender stock, No. 16 and heavier, was reduced \$1 a ton on July 10, to 3.15c., Pittsburgh or Cleveland. Although the marking down of prices has failed to arouse most consumers from their seasonal apathy, there is a slight tendency on the part of motor-car makers to purchase material. This mood is likewise extended to parts manufacturers, whose stocks are believed to be far from heavy. Some fair buying late in July from those sources is expected. Other classes of consumers, however, are fairly well covered, and no general resumption in buying is looked for during the summer months.

Coal and Coke

The recent changes affecting quotations on run of oven coke on track for a period of 90 days or more have aroused protests from some producers. The provision, however, is expected to stand for the time being. The concession of 35c. a net ton off list price allowed under the recent ruling has attracted a smattering of orders.

General activity, however, is lethargic, with furnace and foundry coke particularly dull. The Lake movement of slack this season has been somewhat irregular, with very little independent coal having been shipped thus far. Industrial consumption in this district has shrunk drastically since the close of June.

Scrap

Suspensions of shipments have been lifted by one or two mills. Movement of scrap otherwise is extremely dull. Consumers still are out of the market, and dealers are not pressing to sell this month. Current scrap values

are practically nominal, with no open transactions offering an accurate gage. No. 1 steel on the recent Pennsylvania Railroad list is reported to have been sold for delivery to a consumer at \$12.10. A recent 500-ton sale at \$14.50 has established low phosphorus sheet bar crops 50c. a ton lower at \$14 to \$14.50.

Warehouse Business

Warehouse prices have been reduced in line with recent adjustments in base quotations for steel products. The lower prices have not tended to expand business volume, which has been extremely light since July 1.

Concrete Between Sheets As Road Foundation

THE use of steel for road construction was the subject of a British paper, contributed by N. L. Anderson to the International Congress for Steel Development, held at London, June 20 to 23. The author devoted himself largely to a description of the Duplex system designed to do away with concrete slabs of considerable thickness. The system uses a layer of steel sheets on which concrete is poured and then a top covering of sheets, which are then carpeted with an asphaltic or other wearing surface. The author's account is as follows:

Assume a type of subsoil which is capable of carrying a load of $\frac{1}{2}$ a ton a sq. ft. The grass is removed and the surface trimmed down to the required profile of the finished road. If desired a bed of sand 1 in. thick can be spread over the surface but this is not essential.

On this prepared surface are laid a series of mild steel sheets (say 1/16 in. thick). The sheets are laid in tiers across the road, the joints being butted or very slightly lapped and so that the joints in one tier are staggered in relation to the joints in adjacent tiers.

These sheets can go direct from rolling mills to the road, the necessary workmanship being done on them at site with a simple and cheap machine. This workmanship consists essentially of providing steel shear members which are attached to the sheets. The spacing of the shear members may be varied to suit the weight of traffic, but 6 in. is a normal arrangement.

Upon the bottom layer of sheets which have been laid in the manner described above, concrete is poured to a depth of approximately 3 in. Immediately thereafter a further layer of steel sheets is laid down on the wet concrete. Joints between the sheets in the top layer are arranged in staggered fashion as in the bottom layer and are further so arranged that joints in the top layer do not

occur over joints in the bottom layer. Means are provided whereby adjacent sheets may be interconnected both in the top and in the bottom layers in such a way as to develop the full strength of the sheets.

Where the roadway curves, the lapping of adjacent sheets in either layer is increased accordingly so that no specially shaped sheets are required for the purpose of turning curves.

Means are provided for pressing down the top layer in close contact with the concrete for 48 hr. until the concrete has set. On the upper surface of the top layer is placed the asphaltic or other carpet which may form the road surface.

An intelligent foreman and 28 men will complete 112 sq. yd. of road foundation in 8 hr. This does not include the initial grading but includes all other operations, preparing and laying the sheets, mixing concrete and finishing off completely. The men may be unskilled, and there is, of course, no limit to the number of men who may be employed on a stretch of road.

Of the 28 men, eight are employed on concrete mixing and laying; and this number may be reduced by the use of suitable pouring plant.

The concrete is poured on to a continuous steel surface. The water in the concrete is therefore retained and the correct chemical action takes place. Further, the concrete is at once covered by the top plates and is protected from atmospheric and other damage during the period of setting.

The cross-sectional area of steel in the top and bottom plates is sufficient to absorb the stresses due to temperature changes. There is thus no need to provide expansion joints and the whole of the roadway is a continuous slab in all directions. It ensures a continuous top surface free from the undulations to which expansion joints ultimately give rise. About 400 tons of steel are required per mile.

Steel Output Rises to 33 Per Cent at Chicago



Five Point Gain in Production Is Registered in Spite of Uncertain Outlook for July and August

CHICAGO, July 17.—The mid-summer slump in demand for iron and steel products is in full sway. It is aggravated somewhat by speculative moves made in the spring months but, as near as actual consumption can be gaged, there seems to be substantial reason to believe that late August and September will witness an enlivened market. This is the view taken by the local trade and some indications now point in that direction.

Ingot output appears to be on a better footing at 33 per cent of capacity, a gain of five points in the week. The flow of new orders, though small in the aggregate, are more uniform thereby eliminating some of the difficulties of mill operation that have been experienced in recent weeks. The scrap market, though quiet on the surface, is beginning to rumble and indications are quite clear that some sizable deals are in the making. Consumers are offering resistance to prices, but, notwithstanding the low rate of acceptances, there is no distress tonnage. This condition leads sellers to look for tightening of the price structure.

On the whole, conditions governing support to the steel industry are unchanged. Automobile manufacturers and parts makers lead the procession with farm implement builders falling behind the rate at which they had been holding. A spurt occurs now and then in the building field but the outlook as a whole remains dreary. There is little hope of supplementary tonnages of rails, and car building programs seem remote. Though not openly expressed, there is a general feeling that railroads are increasingly reluctant to add to their obligations.

Pig Iron

Prices for northern foundry are steady as evidenced in a fair amount of spot buying. Jobbing foundries find less work available and working hours are more variable. Two merchant stacks remain in blast and pig iron is accumulating in the hands of producers.

Cast Iron Pipe

An automobile company has bought approximately 1000 tons and a public utility has purchased a substantial

tonnage. This represents the first private buying of consequence in a long period. Pipe makers still have considerable PWA tonnage on their books for which they have not yet received shipping instructions. Delays of four to six months between awards and shipping releases are not uncommon.

Reinforcing Bars

The Sanitary District of Chicago will spend \$500,000 on an addition to its north side sewage disposal plant. The bar requirements have not yet been estimated. Outside of State road and bridge projects, little new work is coming up for figures.

Sheets

The threat of additional price reductions appears to have been sidetracked for the time being. No. 24 hot-rolled annealed sheets are being marked down \$1 a ton, effective July 26. Demand for hot mill products is spotty from the great bulk of miscellaneous users. The best support to rolling schedules comes from automobile companies and parts makers scattered throughout a wide area in the Middle West.

Plates

Shipments are very light and prospects for betterment are far from bright. Oil country goods are dormant and tank makers are badly in need of tonnage. Mills are keeping an eye on the railroads, which, with Government aid and encouragement, are still counted on to enter the equipment field in a broad way. Much preliminary work is now being done on an equipment program but there is no intimation as to when it will become a reality and thereby furnish needed backlogs to steel producers.

Rails and Track Supplies

Old rail orders are evenly spread and present operating schedules will hold to about the end of August. The prospects for new tonnages seem rather remote. There are no tentative inquiries on which to base hopes and the trade has come to believe that those railroads that now have tonnages on order will not supplement their commitments by new orders. However, the attitude of the Government, in attempting to stimulate busi-

ness, is unknown and some additional business may develop through the channels by which it has been made easier for the railroads to buy. Track fastening business is very dull, indicating that present trackwork programs are practically completed.

Wire Products

Prices remain steady and it is evident that sellers are in a frame of mind to hold to current levels. Shipments reflect the mid-summer decline which usually continues until about the middle of August. Producers, in attempting to look forward, anticipate that the second half will prove to be about equal to the first six months of the year. The outlook in agricultural areas is improved but the spring rush of outdoor work is past and the needs of farmers are not expected to rebound more than about half way to the spring peak. Most reinforcing mesh needs are covered and this market is quiet.

Structural Material

Once again highway bridge work holds the center of attraction in this market. Tonnages represented both by awards and fresh inquiries are small. One of the bridges at Lemont, Ill., may not go forward immediately, pending investigation of a threatened over run of the money available for its construction. At Glenview, Ill., an important overhead crossing is not being built while adjacent property needed for a run around road is being passed through condemnation proceedings.

Bars

Added life is coming to this commodity as result of new buying and releases by automobile manufacturers and parts makers who now have defined requirements for August production schedules. Farm implements are moving slowly and no plans have been made known for fall production schedules. In recent years this industry has set plans back as far as December in order to spread employment in the winter months.

Scrap

This market remains quiet though some sizeable deals are in the making. Stocks in the hands of mills are known to be of moderate size and old orders are near the vanishing point. Prices, though unchanged, are leaning toward the weak side. Although mills are taking scrap in a very limited way, matching acceptances with actual consumption, there is no distress tonnage. Dealers take this as a sign of security in that supplies will not stand in the way of higher prices when other factors tend in that direction. The Santa Fe is offering 5300 tons which includes 2000 tons of heavy melting and 1000 tons of No. 2 wrought. Tonnages that have been accumulated at local docks have been inactive for more than a month.

Steel Orders Restricted In Eastern Pennsylvania



Ingot Production Holds at 22 Per Cent of Capacity, But Raw Steel Is Being Stocked

—Black Sheets Reduced

PHILADELPHIA, July 17.—The iron and steel market in this district is extremely dull. Some makers report that bookings the past week were as low as at any time during the depression. While a sharp shrinkage was expected following second quarter coverage, the let-down has been sharper than had been anticipated. The situation also is disconcerting because of uncertainty. Railroad buying of importance appears to be at an end for some time to come. Construction work continues to lag and while a pickup in automotive orders is in prospect, the general view is it will not be heavy during the remainder of the quarter. The only large business seen at this time is Navy work, but it will not develop until after Aug. 15, when bids will be taken on 20 vessels, requiring about 41,000 tons of plates and shapes. Another deterrent is the Presidential order of June 29. While it has been interpreted as providing for reduced prices on governmental business only, the belief prevails that it will bring the prices for general buyers down to a common level. The reduction of \$1 a ton on hot-rolled annealed sheets also has disturbed the market. While as yet other grades have not been reduced further, the trade is apprehensive that they will be.

There is a feeling, however, that while the market probably will remain sluggish throughout the remainder of July and August, a forward movement may be expected early in September as the result of consumption of existing stocks and accumulation of requirements.

Some mills are entirely down, while others are operating on considerably reduced schedules. One small structural mill will resume operations today. Meanwhile open-hearth furnace operations remain unchanged at an estimated rate of 22 per cent of capacity. Ingots are being stocked and one plant, having piled a large quantity of steel, will take off its two furnaces for repairs.

Pig Iron

Only small lots are moving. Melters generally are well supplied with

iron and those coming into the market are only taking immediate requirements.

Plates, Shapes and Bars

Demand is almost negligible: There has been a slightly larger movement of plates for miscellaneous uses, but only light lots are being booked. Fabricators report that only small projects are before them for estimates. The Phoenix Bridge Co. has been awarded a contract for a bridge over the Connecticut River at Littleton, N. H., requiring 410 tons. The Olmer Iron Works, Jersey City, N. J., has been awarded a contract calling for 1725 tons for a State armory in that town. Bids will be opened July 23 for the lighthouse tender Jasmine, calling for 150 tons.

Mining Demand Is Sustained in Canada

TORONTO, ONT., July 17.—While there has been little change in the Canadian iron and steel markets during the past two weeks, officials of various companies state that sales in the first half of this year were considerably higher than for any similar period in the past three years. Demand for iron, steel and equipment for mining operations and the automotive industry was responsible for the greater part of the betterment. Movement of sheets on automotive account, however, is beginning to taper off, but buying from the mining industry is sustained. Sales of bars, wire and fencing also are in good volume. The building trades are dull, with indications of some improvement soon as a result of the program announced by the Federal Government.

The agricultural implement industry is maintaining operations at a fair rate owing to export demand, while it also is stated that there has been some minor improvement in demand for implements on domestic account. Radiator and sanitary manufacturing firms are doing little business.

Warehouse Business

Jobbers report that fair-sized bookings of miscellaneous tonnages have been taken at the new reduced prices.

Sheets

Eastern Pennsylvania mills have announced they will meet the reduction of \$1 per ton to 2.40c., Pittsburgh, on hot-rolled annealed sheets, which was filed last week. The original third quarter price for this grade was 2.65c., although little if any tonnage was taken at the level first filed. Demand generally is dull. Stove makers, however, are taking fair-sized tonnages, and there is also a moderate movement of galvanized sheets to jobbers, and pipe and gutter manufacturers.

Imports

The following iron and steel imports were received here last week from Belgium: 20 tons of structural shapes, 9 tons of steel bands, 4 tons of steel bars and 3 tons of diamond plates.

Scrap

While the market remains quiet, and two mills are holding up shipments, dealers are reluctant to sell. They think that by holding supplies they will be able to get higher prices before long. There is no distress tonnage on the market, but mills are showing little or no interest in the market.

Demand for merchant pig iron is spotty with sales holding around 500 tons a week. Little demand is reported in the immediate Toronto area, but there is a steady small tonnage movement to melters in the province. Individual orders during the week were confined to single carlots, with no future delivery contracts in sight. Production is holding around 38,000 to 40,000 tons a month, with the greater part of the output in basic iron for the further use of producing companies.

Canadian pig iron makers have revised their method of basing prices along the lines of the NRA program. Canadian prices are now figured on a Toronto base of \$20.50 per ton for 2.25 silicon and under with each increase of 0.25 per cent adding 25c. a ton.

Larger shipments of iron and steel scrap are reported by local dealers and it is stated that the Steel Co. of Canada again is taking heavy melting steel and turnings. Some local dealers report good movement in steel scrap, while others state that sales are slow to stagnant. In the Montreal area, demand is reported on export account with little movement to domestic consumers.

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Bethlehem Special High-Speed Tool Steel is used for lathe, planer, boring, slotting, shaping and other roughing tools. It is also used for twist drills, milling cutters, taps, reamers, gear cutters, inserted saw teeth, inserted milling cutter teeth, special dies, wood-working tools, punches, and threading dies. At its forging heat this steel can be readily formed into shapes necessary for making intricate tools. Its properties are such that it can be easily annealed.

BETHLEHEM EXTRA-SPECIAL HIGH-SPEED TOOL STEEL

Bethlehem Extra-Special High-Speed Tool Steel is an outstanding steel for use where super-service is demanded. It is particularly well adapted for machining heat-treated alloy steels, brass, bronze or steel castings, extrusion dies and dummy blocks and for all other unusually heavy-duty work.

BETHLEHEM FINISHING TOOL STEEL

Bethlehem Finishing Tool Steel is an alloy water-hardening tool steel which is recommended for the following:

Chilled roll and brass turning tools; master tools and taps; milling cutters; reamers; cutters for finish-reaming, boring and rifling guns; automatic screw-machine forming tools; threading tools, chasers and dies; burnishing dies; cold-drawing dies and mandrels for cold-drawing high-speed and carbon tool steels; brass, bronze, copper and steel tubing and bars.

BETHLEHEM XXX SPECIAL TOOL STEEL

Bethlehem XXX Special Tool Steel is the very best grade of carbon finishing tool steel. It may be used for all purposes for which Bethlehem Finishing Tool Steel is recommended and will give equally good results if the cutting speeds are reduced to meet conditions.

BETHLEHEM SUPERIOR TOOL STEEL

Bethlehem Superior Tool Steel is a carbon-vanadium tool steel, possessing all the characteristics of a straight-carbon tool steel, as well as better physical properties, greater resistance to fatigue, and superior cutting qualities.

BETHLEHEM XX TOOL STEEL

Bethlehem XX Tool Steel is a general-purpose tool steel of extra-fine quality. This steel is carried in stock in all tempers, suitable for the following: taps and reamers, milling cutters, punches, stamping and blanking dies, broaches, blacksmiths' tools, boilermakers' tools, granite and mining drills and tools, wood-working tools, shear blades, chisels, rivet sets, drop-forging dies, cold-heading bolt and rivet dies, threading dies, headers, trimming dies, and cold-drawing dies.

BETHLEHEM XCL TOOL STEEL

Bethlehem XCL Tool Steel is recommended for all purposes requiring a uniform and reliable yet comparatively inexpensive grade of steel. This steel is used for the following: collets, cups, cones, drop-forging dies, trimming dies, mining and quarrying tools, blacksmiths' tools, fullers, flatters, cold cutters, track tools,

boilermakers' tools, hand and pneumatic chisels, caulking and beading tools, rivet sets, punches and dies, shear blades, and machine parts that require hardening.

BETHLEHEM X TOOL STEEL

Bethlehem X Tool Steel is the lowest-priced grade of carbon tool steel manufactured by Bethlehem Steel Company. It is recommended for purposes where an inexpensive grade of tool steel is satisfactory for the service intended.

BETHLEHEM TOOL ROOM OIL-HARDENING TOOL STEEL

Bethlehem Tool Room Oil-Hardening Tool Steel has been developed especially for use in the tool room in making master tools, dies, intricate pieces, and work of a similar nature.

THESE 5 PROCESSES RESULT IN SUPERFINE TOOL STEEL

QUALITY TOOL STEELS never "happen."

The superfine quality of Bethlehem Tool Steels is built up, step by step, with infinite care and patience, throughout manufacture. Each process followed is representative of the most advanced steel-making practice. The result is inevitable: Tool Steels so uniformly fine as to bring marked economies wherever they are used.



HIGH-FREQUENCY INDUCTION MELTING

Bethlehem Tool Steels get the right start by melting in the high-frequency electric induction furnace, which makes steel to laboratory standards of accuracy.

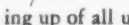
LIBERAL INGOT DISCARD

Large discards, from both the top and bottom of the ingot, mean that the buyer gets only the "cream" of the tool steel.



HAMMER-COGGING OF INGOTS

It's far costlier to hammer-cog ingots than to roll them. But the tremendous impact developed under the 14,000-lb. hammer insures a complete working of the entire ingot and the breaking up of all undesirable ingot structure.



PROGRAM-CONTROLLED ANNEALING

The exact heating, soaking and cooling curve desired is obtained by a motor-driven cylinder on which the edge of a plate guides the temperature regulator. Possibilities of human error are eliminated.



RIGOROUS INSPECTION

Thoroughly representative cross-sections for inspection are obtained by cutting slabs from the tool-steel billet stock before rolling, and cutting discs from the finished bars. These samples are subjected to hot-acid etch, hardenability tests, and microscopic examination.

It is particularly adapted to this class of service because of non-warping and non-shrinking qualities, combined with hardness and toughness. It hardens and anneals uniformly.

This steel is recommended for use in making punching, blanking, trimming, sub-press, forming and drawing dies; taps; reamers; broaches; circular cutters; hobs; master tools of all kinds; plug, ring thread, and service gauges of a variety of forms.

BETHLEHEM No. 71 ALLOY STEEL

Bethlehem No. 71 Alloy Tool Steel is recommended for hand and pneumatic chisels; for punches and shear blades used for cutting scrap, plates, sheets; for set screws and other heavily stressed machinery parts which must be hardened.

BETHLEHEM TOUGH TOOL STEEL

Bethlehem Tough Tool Steel is a chrome-vanadium steel possessing a high degree of hardness and toughness. It is water-hardening, and is recommended for use in making cold cutters, flogging chisels, rivet and button sets, hand and pneumatic chipping chisels, shear blades, punches and similar tools.

BETHLEHEM LEHIGH DIE AND TOOL STEEL

Bethlehem Lehigh Die and Tool Steel is a high-carbon, high-chromium steel. This steel possesses unusual hardening qualities when hardened in oil or air and is especially well adapted to maximum production service. It also possesses non-warping and non-shrinking properties which make it particularly desirable for punch and die work where freedom from distortion is necessary. It has exceptional machinability for this type of steel.

BETHLEHEM "OMEGA" TOOL STEEL

This tool steel possesses an exceptional combination of strength and toughness which makes it an outstanding impact-resisting steel. Bethlehem "Omega" Tool Steel is used in pneumatic chisels, rivet sets, blacksmiths' tools, rivet busters, beading tools, punches, pipe cutter wheels, and in practically all other tools which are subjected to drastic repeated impacts at reasonably low temperatures.

BETHLEHEM No. 57 HOT-WORK TOOL STEEL

Bethlehem No. 57 Hot-Work Tool Steel is a chrome-tungsten steel, especially developed for hot-work tools. This steel possesses exceptional toughness and hardness when working hot metal, which enable it to resist remarkably well the battering action of the header in the hot-heading of bolts and rivets. It is recommended for the following purposes: hot bolt, rivet and spike heading gripper or open dies and headers, hot nut crowners, piercers and punches, hydraulic riveter dies, bull-dozing dies, compression dies, shear blades, and hot chipping chisels.

BETHLEHEM No. 445 HOT-WORK TOOL STEEL

Bethlehem No. 445 Hot-Work Tool Steel is a chrome steel, developed for the same purposes as Bethlehem No. 57 Hot-Work Tool Steel. It has been found equally satisfactory, except where the duty is abnormally severe or when the tool is subjected to unusually high temperatures.

BETHLEHEM STEEL COMPANY



General Offices: BETHLEHEM, PA.

District Offices: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Washington, Wilkes-Barre, York. Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Los Angeles, Seattle, Portland, Honolulu. Export Distributor: Bethlehem Steel Export Corporation, New York.

TOOL STEEL WORTHY OF THE FINEST CRAFTSMANSHIP

Steel Buying Very Light in New York Consuming Area



At Least 150,000 Tons of Steel Involved in Construction Projects to Be Let This Year — Pig Iron Sales Increase

NEW YORK, July 17.—With miscellaneous spot orders for finished steel products still rather scarce in this district, interest is centered on construction projects on which bids will be taken during the late summer and fall. The total tonnage involved in work of this sort is now conservatively estimated at 150,000 tons, most of which will be purchased with PWA funds. The outstanding job is the Tri-Borough bridge at New York, the main span, cables and approaches for which will require 60,000 to 70,000 tons of structural steel and wire. The downtown post office in New York will take approximately 20,000 tons of structural steel and large tonnages will be required for a Bronx post office, a Criminal Courts Building in Manhattan and a number of other projects. The New York Central must still buy 25,000 to 30,000 tons of structural steel for completion of its West Side elevation project in Manhattan, but bids on this job may be delayed for some time. Earlier requirements on the project amount to only a few thousand tons.

Buying of sheets and tin plate in this district is extremely light. Tin plate releases since the first of the month have been negligible and the can companies seem to intend to use up the large stocks they accumulated during May and June in anticipation of labor trouble before making further commitments. Export demand is well maintained. Sales of pipe are holding up relatively better than is the case with other finished steel products. The oil companies are placing business regularly but standard pipe continues rather dull. Alloy steel bars have been very quiet since July 1.

Reductions of \$1 a ton have been filed on hot-rolled annealed sheets, No. 24 gage, and on hot-rolled, pickled-in-the-breakdown, annealed, deoxidized sheets. Price reductions on other products are now generally effective but do not seem to be stimulating business.

Pig Iron

Sales of all grades of iron last week aggregated about 1600 tons, as com-

pared with 450 tons in the preceding period and 950 tons booked two weeks earlier. The present market inertia is a result of the heavy deliveries made last month, and unless foundry melt changes decidedly it is estimated that consumers' stocks will suffice until early September. A number of users believe that there is a possibility of certain furnaces offering iron lower in an effort to divert more tonnage in their direction. However, this opinion seems unfounded as all furnace representatives voice a preference for marking time rather than trying to attract overbought consumers with price manipulations.

Reinforcing Steel

The American Steel & Wire Co. will furnish 450 tons of mesh for the Sunrise Highway in Suffolk County, N. Y., and the Pittsburgh Steel Co. has been awarded 170 tons for highway construction in the same county. In addition Carroll-McCreary Co., Inc., will supply 170 tons of bars for the Bayside High School in Queens. A fair number of small orders are being filled by local distributors but there are practically no tonnage inquiries in the current market. Pending projects total about 1000 tons of bars which include requirements for pier sheds on the Hudson River in Manhattan, and a high school at Jamestown, N. Y. Other large projects scheduled for letting in the fall include the new downtown New York post office building and improvements planned by the New York Central Railroad.

Scrap

Brokers' buying prices for steel are now comparatively higher here than at most other points in the country. Nevertheless, local market sentiment is against reductions, and it is very doubtful whether yards would release appreciable tonnages on a lower price basis. Nearby domestic consumers continue to withhold shipping instructions on the few orders which are on books, but this discouraging feature is offset by the fairly steady purchases which are being made at unchanged prices for shipment abroad.

Several boats have recently cleared port for Japan and Italy and others are loading in this vicinity. In addition, a better feeling exists as a result of the appearance of firmer foreign inquiries and the actual placement of several good-sized commitments for September delivery. On the basis of several recent purchases, heavy breakable cast to brokers is now priced at \$7 a ton maximum, No. 1 machinery cast ranges from \$7.50 to \$8, and stove plate is spread from \$5 to \$5.50. All other grades are entirely nominal in the absence of significant transactions although they are probably slightly high as quoted.

Pig Iron Melt Holding Up at St. Louis

ST. LOUIS, July 17.—While the melt of pig iron in the St. Louis territory is decidedly off as compared with the peak, it is still very considerable, especially in view of the extreme heat which is causing melters to curtail operations whenever possible.

One of the largest steel mills in the district, which closed Independence Day, has not resumed operations, while another large mill increased its operations from one to two furnaces because of a large railroad order.

The stove plants in the district have gotten down to a basis of three days a week, working on fall orders, but this is on a more extended basis of operations than usual. The implement business is said to be keeping up, and there still is a heavy demand for washing machines, one leading factor working at 60 per cent of capacity. Jobbing foundries have curtailed more than other interests. There is virtually no buying of pig iron either for future or spot delivery.

Sales of bale ties are spotty, demand in this section being off because of the failure of the oat crop. In the South demand is ahead of last year because of the call for hay and other products for feeds. Warehouse business so far in July is off as compared with the same period in June, which, as a whole, was about 20 per cent better than June of last year.

Sale of approximately 1500 tons of No. 2 heavy melting steel at \$7 a gross ton or 50c. less than the preceding sale, caused a corresponding reduction in the prices made by dealers. This order, the first of any consequence in some time, was divided among three local dealers. Otherwise the market is nominally unchanged. No buying is expected during the remainder of July. The Missouri Pacific list of between 4000 and 5000 tons closes this week, and it is expected that much of it will go to Colorado markets.

Steel Production Declines In Cleveland-Lorain Area



**Ingot Output Drops to 32 Per Cent
of Capacity With Mills Badly in Need
of Tonnage to Maintain That Rate**

CLEVELAND, July 17.—Business in finished steel was very light the past week. The automotive industry is supplying about the only new tonnage and placed some orders for sheets and strip for current requirements. This business was taken at the new prices which are now in effect on practically all products on which changes have been made recently. With present good operations of automobile plants making low price cars, mills look for a fair volume of fill-in orders until the depletion of stocks accumulated in June necessitates heavier buying.

Large tonnages in truck wheel rim steel were placed during the week. These are special sections not covered by code prices. Wheel manufacturers placed heavy orders for these sections in April and these stocks have about been exhausted.

Ingot output in the Cleveland-Lorain territory declined two points to 32 per cent of capacity this week, one local furnace being taken off. All the mills are badly in need of tonnage. Some of the larger consumers of bars, plates and shapes have advised producers who have solicited them for releases that they expect to order additional steel around the end of the month. Building activity remains slack in this territory and no business is coming from the railroads.

The first round lot sale of pig iron in this territory at the new price has been made to a Cleveland consumer. At least one other producer has followed a Pittsburgh district mill in reducing hot-rolled annealed sheets \$1 a ton to 2.40c. A total absence of demand for steel-making scrap has resulted in a 50c. decline on steel-making grades.

Pig Iron

A Cleveland consumer has bought 500 tons of foundry iron at \$18.50, this being the first sizeable purchase in this territory since the \$1 a ton price advance. Other activity is limited to car-lot sales of spot iron. Foundry melt has declined somewhat this month. Producers report that stocks taken in during June were only sufficient in most cases to last foundries until about Aug. 15 and they

look for some pick up in the demand early next month.

Iron Ore

Receipts at Lake Erie docks up to July 1 were 4,585,240 tons as compared with 1,343,276 tons during the same period last year. June receipts were 3,117,649 tons. Receipts at other than Lake Erie ports last month were 1,150,962 tons and for the season 1,833,705 tons. Total receipts at lower lake ports until July 1, were 6,418,945 tons. Shipments from Lake Erie ports were 2,426,860 tons for June and 4,107,531 tons for the season until July 1, as compared with 1,322,891 tons for the same period last year. The dock balance at Lake Erie ports July 1 was 4,342,996 tons, a slight decrease from a year ago when the amount on docks was 4,788,748 tons.

Strip Steel

Orders for small tonnages at the new prices have come from the automotive industry but consumers in other fields have plenty of strip for current needs. Independent cold-rolling plants have heavy stocks of hot-rolled strip. The market is established at 1.85c., Pittsburgh, for hot-rolled strip and 2.60c., Cleveland, for cold-rolled material.

Bars, Plates and Shapes

With no new public projects in this territory, structural inquiry is light, although a few small new industrial jobs have come out. The State highway department placed several small highway bridges during the week, requiring 250 tons of reinforcing bars. Some railroad bridge work is in prospect. Orders for merchant are very light, few being for as much as a carload. Boiler and tank builders report that they are figuring on more work than for some time.

Sheets

Some new business in small lots continues to come from the motor car industry for immediate shipment and evidently for early requirements. There is virtually no new demand from other sources as consumers still have large stocks. Following a price

reduction of \$1 a ton for 24-gage hot rolled annealed sheets to 2.40c. and to 2.80c. for hot-rolled, pickled-in-breakdown sheets, some of the mills have already announced that they will meet the new prices when they become effective July 20. The refrigerator industry is cleaning up its season's production and has curtailed operations sharply. Washing machine manufacturers have slowed down.

Scrap

A small tonnage of blast furnace scrap has been purchased by a Cleveland mill at \$7.50, the same price it paid several weeks ago. Dealers are paying \$7 to \$7.25 a ton to cover against this order. Consumer demand for steel making grades is lacking and these have declined 50c. a ton. Yard dealers are paying \$9 and higher for No. 1 heavy melting steel, depending on the grade.

Rail Mills Closed At Birmingham

BIRMINGHAM, July 17.—The Ensley works of the Tennessee Coal, Iron & Railroad Co. were closed down Sunday, bringing a substantial reduction in the iron and steel operations of this district. Five open-hearths, the rail mill and three blast furnaces were included in closing. The blast furnaces have been banked for the time being.

The stoppage of work at Ensley was expected as recently there has been very little new rail tonnage to prolong production. It is not likely that operations will be resumed soon. These changes leave seven active blast furnaces and six active open-hearth units in the district.

Current business in both pig iron and steel is light and there is not much interest in the market, as consumers are now heavily stocked in most all lines.

The ore strike, which began May 4, is now settled. Two weeks ago the Tennessee company reached an agreement with its employees, and the other companies settled their difficulties last week.

New England Foundry Melt Declining

BOSTON, July 17.—A slight flurry in steel turnings was the one feature of the scrap market in the past week. Bidding for turnings by one broker lifted the price from \$1.80 a ton on cars shipping point to \$2.05, but the aggregate tonnage actually purchased was comparatively small. Current scrap prices are still unat-

tractive to yards and only an occasional car of distress material is moving into consumption. Operations at the largest New England consuming plants have slowed down and stocks of scrap are sufficient for July needs. Foundries are buying machinery and textile cast in truckloads, and scrap brokers do not figure in the market.

Business in pig iron is virtually at a standstill. Furnaces have scarcely any orders on their books for New England delivery, melters having completed their contracts prior to July 1. The melt in Connecticut is relatively more active than in other New England States. Concerns like Underwood-Elliott Fisher Co. and the Royal Typewriter Co. are quite busy, as are some of the machinery builders. In Massachusetts, electrical equipment, valve and pipe fittings, special machinery and shoe manufacturers are busy, but otherwise industry has slowed up perceptibly, tending to curb pig iron consumption.

Large Dam Lettings Reported in West

SAN FRANCISCO, July 16.—Mill production continues to be restricted, with the major units of one mill closed entirely for seasonal repairs. Awards of steel tonnages have been less than for any week of the second and third quarters. With the movement of scrap to the Orient blocked by strike conditions, sales are limited to the decreased domestic demand. However the price remains at \$10 per gross ton.

Formal award of the general contract for the Grand Coulee low level dam and power plant, to be constructed near Almira, Wash., has been made to Silas Mason Co. Included in the project is an estimated tonnage of 12,500 tons of reinforcing bars, 8600 tons of structural steel and 15,000 tons of sheet piling. Frazier-Davis Construction Co. and G. L. Tarlton are low bidders for constructing a cut-off wall at Fort Peck Dam, near Glasgow, Mont. Approximately 15,000 tons of sheet piling will be required.

The booking of 2035 tons of structural steel by Consolidated Steel Corp. for the M Street bridge in Sacramento was the outstanding letting of the week. Poole & McGonigle were reported as the successful bidders on 525 tons of reinforcing bars for the Siuslaw River bridge as well as on 650 tons of bars for the Umpqua River bridge, both in Oregon. Beall Pipe & Tank Corp. is low bidder on 1870 tons of plates for a pipe line at Tacoma, Wash. Few new projects were added during the week to the pending list.

Buffalo Steel Output Gradually Improving

BUFFALO, July 17.—Steel production in this territory is beginning to pick up following the holiday over July 4. Bethlehem's Lackawanna plant operated three open-hearths the latter part of last week and increased to five on Monday. Republic Steel Corp. began with two open-hearths and increased this to three, operating two bar mills and a blooming mill at the same time. Wickwire-Spencer Corp. is operating one open-hearth and Seneca sheet division of Bethlehem has increased to 30 per cent.

New structural steel business is slow, though one of the current jobs is a high school at Jamestown, N. Y., to require 475 tons. Bids will be opened Aug. 14 for the new Kensington high school. A tonnage of bars will be used in this job as well as 1200 tons of structural steel already mentioned.

Pig iron business is very slack with only hand-to-mouth buying of small tonnages.

Scrap iron interests are looking to September, and do not believe there will be any great demand before that time. A sale of 200 tons of cupola cast at \$8.50 is reported. Occasionally an inquiry for short rails comes out. The last sale made was at \$12.50 to \$13.

Sheet Demand Spurts In Cincinnati Area

CINCINNATI, July 17.—Urgent requirements of sheet users swelled bookings last week to an unexpected level of 50 per cent of capacity. Detroit users accounted for a substantial portion of the spurt, although general demand was encouraging. The leading interest reports that total business is on a much better ratio than during normal times. Current business will warrant mill operations in the neighborhood of 40 per cent of full capacity, this week. Prices are steady.

Coke

Foundry coke demand is virtually nil, while the low melt is tending to restrict shipments.

Pig Iron

A more than usual seasonal decline in pig iron has made the district market extremely dull and listless. Sellers booked less than 300 tons in prompt and third quarter business last week. Quotations on both northern and southern are firm and furnaces indicate no immediate change in prospect. Foundry operations are at low ebb, the melt being held to a few heats weekly. Some automotive and

a few specialty melters report fair business, but this is insufficient to raise the market average. Shipments also tend downward.

Warehouse Business

While the usual seasonal letdown has depressed jobbers' business, demand is holding fairly well to the June level. Industrial users are still most prominent on the books, although construction projects are brighter.

Scrap

With mill operations curtailed, the old materials market is extremely lifeless. Bids are nominal, scrap being worth whatever can be obtained. Dealers are wary of sales, except for application on the few old contracts still uncompleted.

Pipe Lines

Fort Smith, Ark., plans 27-in. steel pipe line (with alternate bids asked on reinforced concrete pipe) from vicinity of Clear Creek, near Mountainburg, about 23 miles, for new trunk water system; also 16, 20 and 24-in. cast iron pipe for distribution lines. Fund of \$1,650,000 has been secured through Federal aid for development of new water supply source. W. R. Holway, 320 East Eighteenth Street, Tulsa, Okla., is consulting engineer.

Middlesex Pipe Line Co., affiliated with Sun Oil Co., 1608 Walnut Street, Philadelphia, has secured permission from Newark, N. J., to build welded steel pipe line through certain streets for connection with bulk oil plant of last noted company on Passaic River. Line will be built from refinery at Marcus Hook, Pa., to Washington's Crossing, Pa., across Delaware River and thence to Newark through several counties. Total about 100 miles. Cost \$475,000. Middlesex company has secured permission from Public Utilities Commission, New Jersey, to issue stock for \$299,000 to defray part of cost of new line.

Sunbright Pipe Line Co., Sunbright, Tenn., plans welded steel pipe line from natural gas fields to Knoxville, Maryville and Jellico, Tenn., and vicinity for commercial gas supply. Company has recently secured authority for new lines to Harriman, Rockwood, Kingston, Lenoir City and vicinity, for natural gas service. Cost about \$1,000,000. J. H. Graham is president.

Western Gas Co., Phoenix, Ariz., plans welded steel pipe line from natural gas city for natural gas; also will build new line from city limits to Tempe, Ariz., for gas supply at that place.

Texas Gas Utilities, Eagle Pass, Tex., has let contract to Nicholas Saigh Co., Builders' Exchange Building, San Antonio, Tex., for extensions and improvements in main 10-in. welded steel pipe line for natural gas trunk system. Cost about \$55,000.

Apropos of the American suggestion that debtor countries might pay the United States in commodities such as tin, the Belgian trade paper, *Echo de la Bourse*, has stated: "We would point out that the Belgian Government does not own the Congo or Ruanda-Urundi tin deposits. These are the property of private companies and the Belgian Government has no more money with which to buy their tin than it has to pay its debts to the Government of the United States."

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.00c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Duluth	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.55c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Reading, Pa.	1.75c.
F.o.b. Danville, Pa.	1.75c.
F.o.b. Berwick, Pa.	1.75c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

	Base per Net Ton
F.o.b. Pittsburgh	\$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston	59.00
F.o.b. cars dock Pacific ports	67.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.985c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh.	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled

Hot Rolled		Base per Lb.
No. 10, f.o.b.	Pittsburgh	1.85c.
No. 10, f.o.b.	Gary	1.95c.
No. 10, del'd	Detroit	2.05c.
No. 10, del'd	Phila.	2.14c.
No. 10, f.o.b.	Birmingham	2.00c.
No. 10, f.o.b. dock cars	Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.45c.
No. 24, f.o.b. Gary	2.55c.
No. 24, del'd Detroit	2.65c.
No. 24, del'd Phila.	2.74c.
No. 24, f.o.b. Birmingham	2.60c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.35c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Terns

No. 24, unassorted 8-lb. coating	
f.o.b. Pittsburgh	3.45c.
F.o.b. cars dock Pacific ports	4.15c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
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Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.25c.

Tin Plate Base per Box

Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

	Base per Lb.
All widths up to 24 in., P'gh.....	1.85c.
All widths up to 24 in., Chicago.....	1.95c.
All widths up to 24 in., del'd De- troit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh.....	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 16 and heavier, Pittsburgh or Cleveland	3.15c.
No. 17 and lighter, Pittsburgh or Cleveland	3.55c.
F.o.b. Worcester	3.70c.

Hot-Rolled Rail Steel Strips

Hot-Rolled Rail Steel Strips	
	Base per Lb.
F.o.b. Pittsburgh.....	1.70c.
F.o.b. Chicago.....	1.75c.
F.o.b. Birmingham.....	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade Per Lb.

Bright wire	2.30c.
Spring wire	3.20c.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg

Standard wire nails	\$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

Base per 100 Lb.

Annealed fence wire	\$2.45
Galvanized fence wire	3.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are \$9 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also \$9 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are \$9 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are \$8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are \$11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

Base per Net Ton	
F.o.b. Pittsburgh	\$63.00
F.o.b. Chicago	64.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	66.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE

AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Inches	Black Galv.	Wrought Iron
1/4	51 1/2	29 1/2
3/8	53 1/2	35
1/2	58 1/2	47
3/4	62 1/2	52
1 to 3	64	55
1/2	43 1/2	28
3/4	41 1/2	26

Lap Weld

2	60	51	2	37	22 1/2
2 1/2	63	54	2 1/2	38	25
3 1/2	65	56	4 to 8	40	28 1/2
7 and 8	64	54	9 to 12	38	24 1/2
9 and 10	63 1/2	53 1/2			
11 and 12	62 1/2	52 1/2			

Butt Weld, extra strong, plain ends

1/4	48 1/2	33 1/2	1/4	13	45 1/2
3/8	51	38	3/8	2 1/2	34 1/2
1/2	56 1/2	47 1/2	1/2	32 1/2	17 1/2
3/4	61	52	3/4	37 1/2	22 1/2
1 to 3	63	55	1 to 2	43 1/2	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2 1/2	62	54	2 1/2	45 1/2	33
3 1/2	65 1/2	57 1/2	4 1/2	6 45	33 1/2
7 and 8	64 1/2	54 1/2	7 and 8	46	33
9 and 10	63 1/2	53 1/2	9 to 12	41 1/2	30
11 and 12	62 1/2	52 1/2			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the

carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$ 8.60	....
1 1/4 in. o.d. 13 B.W.G.	10.19	....
1 1/2 in. o.d. 13 B.W.G.	11.26	....
1 3/4 in. o.d. 13 B.W.G.	12.81	....
2 in. o.d. 13 B.W.G.	14.35	\$13.94
2 1/4 in. o.d. 13 B.W.G.	16.00	14.54
2 1/2 in. o.d. 12 B.W.G.	19.29	17.54
2 3/4 in. o.d. 12 B.W.G.	20.45	18.59
3 in. o.d. 12 B.W.G.	21.45	19.50
3 1/4 in. o.d. 11 B.W.G.	25.22	22.93
3 1/2 in. o.d. 11 B.W.G.	27.09	24.62
4 in. o.d. 10 B.W.G.	33.60	30.54
4 1/4 in. o.d. 10 B.W.G.	41.08	37.35
5 in. o.d. 9 B.W.G.	51.56	46.87
6 in. o.d. 7 B.W.G.	79.15	71.94

Extras for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
10,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %
2,000 lb. or ft. to 9,999 lb. or ft. 25 %
Under 2,000 lb. or ft. 40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1 1/4 in. o.d. 13 B.W.G.	\$ 9.72
1 1/2 in. o.d. 13 B.W.G.	11.96
2 in. o.d. 13 B.W.G.	12.38
2 1/4 in. o.d. 13 B.W.G.	13.79
2 1/2 in. o.d. 12 B.W.G.	16.58
2 3/4 in. o.d. 12 B.W.G.	17.54
3 in. o.d. 12 B.W.G.	18.35
3 1/4 in. o.d. 11 B.W.G.	21.56
3 1/2 in. o.d. 11 B.W.G.	23.15
4 in. o.d. 10 B.W.G.	28.66
4 1/4 in. o.d. 10 B.W.G.	35.23
5 in. o.d. 9 B.W.G.	44.25
6 in. o.d. 7 B.W.G.	68.14

Quantity Extras:
40,000 lb. or ft. to 39,999 lb. or ft. base
25,000 lb. or ft. to 9,999 lb. or ft. plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft. plus 12 1/2 %
2,000 lb. or ft. to 9,999 lb. or ft. plus 25 %
Under 2,000 lb. or ft. plus 40 %

CAST IRON WATER PIPE

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagonal	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Store bolts in packages, Pittsburgh	75
Store bolts in packages, Chicago	75
Store bolts in packages, Cleveland	75
Store bolts in bulk, Pgh.	83
Store bolts in bulk, Chicago	83
Store bolts in bulk, Cleveland	83
Tire bolts	60

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

	Per Cent Off List
Cap and Set Screws	
(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)	
Milled cap screws, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread 1/4 in. and smaller	75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws, cut and oval point	75 and 10
Milled studs	65

Alloy and Stainless Steel

	Per Gross Ton
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem	Unrecropped
Unrecropped	\$40 per gross ton

	Per Gross Ton
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem	Base price, \$49 a gross ton.
Price del'd Detroit is \$52.	

	Per Gross Ton
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	Open-hearth grade, base
Delivered price at Detroit is	2.60c.
S.A.E. Series	Alloy Differential per 100 lb.
Numbers	
2000 (1/2% Nickel)	\$0.25
2100 (2 1/4% Nickel)	0.55
2300 (3 1/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
4100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

	Per Gross Ton
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.	

	Per Gross Ton
STAINLESS STEEL No. 302	
(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)	
(Base Prices, F.o.b. Pittsburgh)	

	Per Gross Ton
Bars	23c.
Plates	26c.
Sheets	23c.
Hot-rolled strip	20 1/2 c.
Cold-rolled strip	27c.

Raw and Semi-Finished Steel

Carbon Steel Re-rolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	Unrecropped
Unrecropped	\$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham	Unrecropped
Unrecropped	\$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	Per Gross Ton
Re-rolling	\$27.00
Forging quality	32.00
Delivered Detroit	\$30.00
Forging	33.00

Billets Only F.o.b. Duluth	Re-rolling
Re-rolling	\$29.00
Forging	34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.	Per Gross Ton
Open-hearth or Bessemer	\$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Tube Rounds

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common soft, base)

	Per Gross Ton
F.o.b. Pittsburgh	\$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	19.50	18.50	18.00	19.00
Sparrows Point, Md.	18.50	18.50	18.00	19.00
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	18.50	17.50	19.00
Erie, Pa.	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	20.50
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	19.00	19.00	18.50	19.00
Duluth, Minn.	14.50	14.50	13.50	19.00
Birmingham	17.50	17.50	17.00	19.00
Provo, Utah	17.50	17.50	17.00	19.00

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District	\$20.00	\$20.50	\$19.50	\$21.00
From Everett, Mass.	21.77	22.27	21.27	22.77
Brooklyn	20.89	21.39	20.39	21.89
From East Pa. or Buffalo	20.89	21.39	20.39	21.89
Newark or Jersey City, N. J.	20.26	20.76	19.76	21.26
From East Pa. or Buffalo	20.26	20.76	19.76	21.26
Philadelphia	19.51	19.51	19.01	20.01
From Eastern Pa.	19.76	19.76	19.26	20.26
Cincinnati	20.50	20.50	19.50	20.50
From Hamilton, Ohio	20.26	20.26	19.26	20.26
Canton, Ohio	20.50	20.50	19.50	20.50
From Cleveland and Youngstown	20.26	20.26	19.26	20.26
Columbus, Ohio	20.50	20.50	19.50	20.50
From Hamilton, Ohio	20.26	20.26	19.26	20.26
Mansfield, Ohio	20.50	20.50	19.50	20.50
From Cleveland and Toledo	20.26	20.26	19.26	20.26
Indianapolis	20.50	20.50	19.50	20.50
From Hamilton, Ohio	20.26	20.26	19.26	20.26
South Bend, Ind.	20.50	20.50	19.50	20.50
From Chicago	20.26	20.26	19.26	20.26
Milwaukee	20.50	20.50	19.50	20.50
From Chicago	20.26	20.26	19.26	20.26
St. Paul	20.50	20.50	19.50	20.50
From Duluth	20.26	20.26	19.26	20.26
Davenport, Iowa	20.50	20.50	19.50	20.50
From Chicago	20.26	20.26	19.26	20.26
Kansas City	21.04	21.04	20.04	21.04
From Granite City	21.04	21.04	20.04	21.04

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$23.50
Johnson City, Tenn.	19.50
Del'd Chicago	25.15

GRAY FORGE PIG IRON

Valley furnace	\$18.25
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CHARCOAL PIG IRON

Lake Superior furnace	\$21.00
Delivered Chicago	24.04
Delivered Buffalo	24.28

CANADA

Pig Iron

Per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans	Per Gross Ton
Domestic, 80% (carload)	\$85.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$26.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

	Per Gross Ton	Per Gross Ton
F.o.b. Jackson, Ohio, Furnace		
6%	\$22.75	12% \$29.25
7%	23.75	13% 30.75
8%	24.75	14% 32.25
9%	25.75	15% 33.75
10%	26.75	16% 35.25
11%	27.75	17% 36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

	Per Gross Ton	Per Gross Ton
F.o.b. Jackson, Ohio, Furnace		
10%	\$27.75	14% \$33.25
11%	28.75	15% 34.75
12%	29.75	16% 36.25
13%	30.75	17% 37.75

Manganese 1 1/4 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 ton additional. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads	\$1.40 to \$1.50
Ferrotungsten, less carloads 1.55 to 1.60	
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered in carloads	10.00c.
Ferrocromium, 2% carbon	16.50c. to 17.00c.
Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	\$2.70 to \$2.90
Ferrocobaltititanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo. del.	95c.
Calcium molybdate, per lb. Mo. del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	\$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting steel	10.50 to 11.00
No. 2 railroad wrought	11.50 to 12.00
Scrap rails and under	11.50 to 12.00
Rails 3 ft. and under	14.50 to 15.00
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	7.00 to 7.50
Cast iron borings	7.00 to 7.50
Cast iron carwheels	11.50 to 12.00
Heavy breakable cast	10.00 to 10.50
No. 1 cast	12.00 to 12.50
Rail. knuckles and couplers	13.75 to 14.25
Rail. coil and leaf springs	13.75 to 14.25
Roller steel wheels	13.75 to 14.25
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.00 to 14.50
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	14.00 to 14.50
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$9.25 to \$9.75
Automobile hvy. melt. steel	8.50 to 9.00
Shoveling steel	9.25 to 9.75
Hydraulic comp. sheets	8.25 to 8.75
Drop forge flashings	7.25 to 7.75
No. 1 busheling	7.75 to 8.25
Roller carwheels	10.00 to 10.50
Railroad tires	10.00 to 10.50
Railroad leaf springs	10.00 to 10.50
Steel couplers and knuckles	9.75 to 10.25
Coil springs	10.00 to 10.50
Steel turnings (elec. fur.)	8.25 to 8.75
Low phos. punchings	10.25 to 10.75
Low phos. plates, 12 in. and under	10.25 to 10.75
Cast iron borings	4.75 to 5.25
Short shoveling turnings	4.75 to 5.25
Machine shop turnings	4.75 to 5.25
Rerolling rails	10.25 to 10.75
Steel rails, less than 3 ft.	10.25 to 10.75
Steel rails, less than 2 ft.	10.75 to 11.25
Angle bars, steel	10.00 to 10.50
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	7.75 to 8.25

Per Net Ton

Iron car axles	\$11.00 to \$11.50
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	7.25 to 8.25
No. 2 railroad wrought	8.00 to 8.50
No. 2 busheling	2.50 to 3.00
Locomotive tires, smooth	14.00 to 14.50
Pipe and flues	3.75 to 4.25
No. 1 machinery cast	8.50 to 9.00
Clean automobile cast	8.50 to 9.00
No. 1 railroad cast	8.00 to 8.50
No. 1 agricultural cast	7.50 to 8.00
Stove plate	5.25 to 5.75
Grate bars	4.75 to 5.25
Brake shoes	6.25 to 6.75

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.50
No. 2 heavy melting steel	\$8.50 to 9.00
No. 1 railroad wrought	11.00 to 11.50
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Machine shop turnings, old	6.00 to 6.50
Heavy axle turnings	9.00 to 9.50
Cast borings	5.50 to 6.00
Heavy breakable cast	10.50
Stove plate (steel works)	8.00 to 8.50
No. 1 low phos. heavy	15.00
Couplers and knuckles	14.00 to 14.50
Roller steel wheels	14.00 to 14.50
No. 1 blast furnace	5.50 to 6.00
Spec. iron and steel pipe	8.00
Shafting	15.00 to 16.00
Steel axles	14.50
No. 1 forge fire	9.50
Cast iron car wheels	11.00 to 11.50
No. 1 cast	11.50 to 12.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.25 to \$7.75
Scrap rails for melting	8.25 to 8.75
Loose sheet clippings	3.75 to 4.25
Bundled sheets	5.75 to 6.25
Cast iron borings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
No. 1 busheling	6.25 to 6.75
No. 2 busheling	2.75 to 3.25
Rails for rolling	8.75 to 9.25
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.25 to 11.75
Cast iron carwheels	7.75 to 8.25
No. 1 machinery cast	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Burnt cast	6.00 to 6.50
Stove plate	6.00 to 6.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	8.00 to 8.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting steel	8.50 to 9.00
Compressed sheet steel	8.50 to 9.00
Light bundled sheet stampings	7.25 to 7.50
Drop forge flashings	8.00 to 8.50
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.50 to 7.75
No. 1 busheling	8.00 to 8.50
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	13.25 to 13.75
Cast iron borings	7.00 to 7.50
Mixed borings and short turnings	7.00 to 7.50
No. 2 busheling	7.00 to 7.50
No. 1 cast	11.50 to 11.75
Railroad grate bars	7.00 to 7.50
Stove plate	6.50 to 7.00
Rails under 3 ft.	14.00 to 14.50
Rails for rolling	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	10.75 to 11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.50 to \$11.00
No. 2 heavy melting scrap	9.00 to 9.50
Scrap rails	10.00 to 10.50
New hydraulic comp. sheets	9.00 to 9.50
Old hydraulic comp. sheets	8.00 to 8.50
Drop forge flashings	9.00 to 9.50
No. 1 busheling	9.00 to 9.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Roller steel wheels	11.50 to 12.00
Low phos. billet crops	12.00 to 12.50
Short shov. steel turnings	6.00 to 6.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.00 to 6.50
Steel car axles	11.00 to 11.50
Iron axles	11.00 to 11.50
No. 1 machinery cast	10.50 to 11.00
No. 1 cupola cast	8.50 to 9.00
Stove plate	8.50 to 8.75
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.50 to 11.00
Industrial malleable	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Chemical borings	7.50 to 8.00

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.75 to \$6.25
Scrap T rails	5.75 to 6.25
No. 2 steel	5.00 to 5.25
Breakable cast	6.00 to 6.50
Machine shop turnings	1.80 to 2.05
Bundled skeleton, long	4.00 to 4.25
Forge flashings	4.00 to 4.25
Blast furnace scrap	2.00 to 2.50
Shafting	10.00 to 11.25
Steel car axles	10.50 to 11.50
Cast iron borings, chemical	8.25 to 8.50
Stove plate	6.50
Per gross ton delivered consumers' yards:	
Textile cast	\$7.50 to \$9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$8.00
No. 2 heavy melting steel	\$5.50 to \$6.50
Heavy breakable cast	8.50 to 9.00
No. 1 machinery cast	7.50 to 8.00
No. 2 cast	6.25 to 6.75
Stove plate	5.00 to 5.50
Steel car axles	10.75 to 11.50
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rerolling	8.00 to 9.50
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	8.00 to 4.00
Per gross ton, delivered local foundries:	
No. machinery cast	\$10.75
No. 1 hvy. cast (cupola size)	9.75
No. 2 cast	8.25

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00
Scrap steel rails	9.00
Short shoveling turnings	5.50
Stove plates	\$7.00 to 7.50
Steel axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	7.00
Rails for rolling	10.50
No. 1 cast	9.00 to 9.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.75 to \$9.25
No. 1 heavy melting	8.50 to 9.00
No. 2 heavy melting	8.50 to 9.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.75 to 9.25
Railroad springs	10.25 to 10.75
Bundled sheets	6.75 to 7.25
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	4.75 to 5.25
Rails for rolling	9.75 to 10.25
Machine shop turnings	4.50 to 5.00
Heavy turnings	5.50 to 6.00
Steel car axles	10.50 to 11.00
Iron car axles	13.00 to 13.50
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron carwheels	8.00 to 8.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	9.00 to 9.50

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.00 to \$7.50
Borings and short turnings	5.00 to 5.50

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.A.I. Philadelphia or Baltimore	
Per Unit	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52% manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48%	20c.

Per Net Ton Unit	
Tungsten, Chinese, wolframite, duty paid, delivered*	\$18.00 to \$18.75
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton	
Chrome, 45%, Cr ₂ O ₃ , crude, a.i.f.	\$17.00
Chrome, 48% Cr ₂ O ₃ , a.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

FLUORSPAR

Per Net Ton	
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	\$17.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$17.50 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke	
Per Net Ton	
Furnace, f.o.b. Connellsville	\$3.85
Foundry, f.o.b. Connellsville	
Prompt	\$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd.	8.20 to 8.81
Foundry, by-product, Phila.	9.00

Long turnings	\$4.99 to \$4.99
No. 1 machinery cast	9.00 to 9.50
Automotive cast	10.00 to 10.50
Hydraulic comp. sheets	7.00 to 7.50
Stove plate	6.50 to 7.00
New factory busheling	6.00 to 6.50
Old No. 2 busheling	4.25 to 4.75
Sheet clippings	3.50 to 4.00
Flashings	6.00 to 6.50
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$5.50 \$5.50
Rails scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 6.00
Axles wrought iron	4.50 6.50
No. 1 machinery cast	7.75 9.00
Stove plate	4.50 5.00
Standard carwheels	7.25 7.00
Malleable	6.75 7.00

Foundry, by-product, Cleveland, delivered	
Foundry, Birmingham	\$9.25
Foundry, by-product, St. Louis, f.o.b. ovens	9.00
Foundry, by-product, del'd St. Louis	9.50

Coal

Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.80 to \$2.95
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.35
Gas coal, 1/4-in. f.o.b. Pa. mines	2.25 to 2.35
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.85c.
No. 5 industrial fuel oil	3.35c.

Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.75c.
No. 4 industrial	5.50c.
No. 5 industrial	4.75c.

REFRACTORIES

Fire Clay Brick	
Per 1000 f.o.b. Works	
High-heat intermediate	
Duty Brick	Duty Brick
Pennsylvania	\$45.00 \$40.00
Maryland	45.00 40.00
New Jersey	55.00 43.00
Ohio	45.00 40.00
Kentucky	45.00 40.00
Missouri	45.00 40.00
Illinois	45.00 40.00
Ground fire clay, per ton	7.00

Chrome Brick	
Per Net Ton	
Standard size	\$45.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago	\$4.00
Birmingham	\$5.00
Silica clay, per ton	8.00

Magnesite Brick	
Per Net Ton	
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	45.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	32.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock	
Rounds and hexagons	3.45c.
Squares and flats	3.45c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.35c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count	
65 per cent off list	
Machine bolts, 100 count	65 per cent off list
Carriage bolts, 100 count	65 per cent off list
Nuts, all styles, 100 count	65 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'l'd, base per 100 lb.	\$2.70c.
Wire, galv. soft, base per 100 lb.	\$2.95c.
Common wire nails, per keg	\$2.834c.
Cement coated nails, per keg	\$2.834c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.
*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.90c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.95c.
Spikes (9/16 in. and lighter)	3.90c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3.50c.
Rivets, boiler (keg lots)	3.60c.
Per Cent Off List	
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	85
Cup point set screws	70 and 10
Flat head bright wood screws	37 1/2 and 10
Spring cotter pins	50
Store bolts in full packages	70 and 10
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$5.00 off list
No. 8 black ann'l'd wire per 100 lb.	\$3.85
Com. wire nails, base per keg	3.95c.
Cement c't'd nails, base per keg	3.95c.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars, weld. charcoal	3.25c.
Cold-fin. shafting and screw stock	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.52c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24)	3.85c.
Galvanized sheets (No. 24)	4.50c.
Long term sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x 1/4 in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	\$3.21
Per Cent Off List	
Machine bolts, cut thread:	
Up to 1 in. dia. inclusive	60
Over 1 in. dia.	50
Carriage bolts, cut thread:	
Up to 1/2 in. dia. inclusive	60
Over 1/2 in. dia.	50
Boiler tubes:	
Lap welded, 3-in.	\$18.05
Seamless welded, 3-in.	19.24
Charcoal iron, 3-in.	24.34
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.14c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.14c.
Galv. corrug. sheets	4.79c.
Structural rivets	3.84c.
Boiler rivets	3.94c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
*Reinforc. steel bars, sq. twisted and deformed	2.95c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
*Hot-rolled anneal. sheets (No. 24)	3.60c.
*Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.35c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	3.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.

†Outside delivery 10c. less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel or iron	3.10c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c.
Hoops and bands, 3/16 in. and lighter	3.60c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Hot-rolled sheets (No. 10)	3.85c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb.	\$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, 1-in., per 100 lb.	3.35
Seamless steel boiler tubes, 3-in., 10 ft.	\$17.50
4-in.	41.69
Lap-welded steel boiler tubes, 3-in. 16 ft.	38.73
4-in.	38.73

BUFFALO

	Base per Lb.
Plates	3.40c.
Struc. shapes	3.30c.
Soft steel bars	3.10c.
Reinforcing bars	2.10c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.67c.
Galv. sheets (No. 24)	4.65c.
Bands	3.57c.
Hoops	3.57c.
Hot-rolled unannealed sheets	3.32c.
Com. wire nails, base per keg	\$3.90
Black wire, base per 100 lb.	3.45c.

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, 1/4 in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.35c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and berels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.30c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tank and	3.55c.	3.70c.	3.55c.
U. M.	3.55c.	3.70c.	3.55c.
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.55c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.

	Hot-rolled sheets (No. 10)	Galv. sheets (No. 24)	Cold finished steel
Rounds	3.75c.	5.00c.	5.95c.
Squares and hexagons	3.80c.	5.05c.	5.95c.
Flats	3.70c.	5.00c.	5.95c.
Common wire nails—base per keg	3.70c.	7.70c.	7.70c.
less carload	\$3.40	\$3.25	\$3.35

All items subject to differentials for quantity.

Price Changes Filed With Institute

THE most important price change filed with the American Iron and Steel Institute in the past week was a reduction of \$1 a ton on hot-rolled annealed sheets, No. 24 gage, to 2.40c., Pittsburgh, effective July 20, and 2.50c., Gary, effective July 26. No. 24 gage, hot-rolled, pickled-in-the-breakdown, annealed, deoxidized sheets were also reduced \$1 a ton to 2.80c., Pittsburgh, effective July 20. Thus far, no change has been filed at Gary. Hot-rolled breakdowns for rerolling, in coils 24 to 48 in. wide, No. 10 gage, have been reduced to 1.95c., Gary, effective July 26. A price of 4.10c., Birmingham, became effective July 10 on No. 24 gage zinc-coated sheets and has just been officially announced. Reduced quotations on painted iron corrugated roofing and siding become effective at Gary on July 24. Pittsburgh and Pacific Coast reductions were effective July 16. A number of additional changes on the various grades of electrical sheets at Pittsburgh, Gary and Pacific Coast ports become applicable from July 16 to 21. Cold-rolled iron strip will be quoted at 3.235c., Cleveland, after July 26.

Pure iron and copper iron plates will be established at 2.10c., Pittsburgh, after July 19. Ingot iron plates have been marked down to 2.44c., Gary, effective July 23. Engine bolt iron, single refined, is quoted at 3.20c. a lb., Burnham, Pa., effective July 23, while the single refined special grade is priced at 3.80c., effective at the same time. Ingot iron billets and slabs for rerolling will be reduced to \$33 a ton, Pittsburgh, and \$35, Cleveland, on July 19, with forging quality material taking the usual \$5 a ton premium.

The following new prices have been filed on drawn wire products and were effective July 12: Rope wire, mild crucible, 4.25c. a lb., Worcester, and 4.75c., Pacific Coast ports; die spring wire, rectangular untempered Swedish, 10.50c., Worcester, and die spring wire, square untempered Swedish, 13.75c., Worcester. Electric furnace chrome silicon steel will be quoted at 5.04c. a lb., Pittsburgh, effective July 23.

The following new basing discounts on mechanical tubing, f.o.b., Pittsburgh, have been filed to become effective July 22: Seamless tubes and tubing, and seamless round automotive tubing, schedule G, group 6, propeller shaft tubes, 47 per cent off list; group 8, steering column jackets and seat frames, 1-in. to 1 1/4-in. O. D., 51 per cent off, and 1 1/4-in. to 2-in. O. D., inclusive, 51 1/2 per cent off; seamless steel conveyor and transformer tubing, schedule D-1, 1 1/4-in. O. D., and larger, 54 per cent off, and under 1 1/4-in. O. D., 51 per cent off.

Spelter Market Improves Statistically Although Sales Are Low at 1500 Tons

Copper Continues Quiet Both Here and Abroad—Lead in Fair Demand at 3.60c.—Market for Straits Tin Remains Inactive

NEW YORK, July 17.—The copper trade has been considerably heartened by the 36,400-ton decline in the world's visible supplies during June, and the statistical position is viewed more optimistically. Total stocks now stand at 502,000 tons, which is 300,000 tons under the peak position of 1930. In the United States shipments for June aggregated 46,500 tons and the combined output of smelters and custom refiners totaled 32,500 tons. These favorable statistics have had no apparent effect on the current selling market, as consumers have contracted against almost all their August and a good proportion of their September requirements. October bookings have been scarcely touched as there is considerable doubt as to what general industrial conditions will be at that time. The market quotation for all bookings is unaltered at 9c. a lb., delivered Connecticut valley, and there is little possibility of any producer

filing a lower price. On the contrary the next buying movement will probably result in an increase to 9.50c. or higher. American producers are pressing their surpluses on foreign markets with the result that the cent equivalent quotation has further declined to 7.35c. a lb., c.i.f. usual Continental ports. Despite this obviously low price there are few inquiries in the market and average daily sales abroad are considered quite unsatisfactory.

Tin

Invisible tin stocks in the United States have been greatly reduced in recent months, but industrial concerns are still unconcerned with regard to inventory replenishments. The world market for tin is even further depressed as users on the Continent are likewise taking very little fresh metal at the moment. However this protracted period of consumer inactivity has not depressed the market

price. Spot Straits at New York has stayed close to 52c. all week and standard prices in London have exhibited remarkable stability. Of course the steadiness of quotations is directly ascribable to artificial support by "the group," which has been steadily purchasing in a successful effort to keep prices from slumping. The complete operations of the pool are still shrouded in secrecy, however, and no information has yet been divulged as to when or how the holdings will be liquidated. It is very likely that quotas of signatory governments will be reduced in the fall, but even then any large selling movement may force the price downward unless industrial demand improves considerably.

Zinc

Late last week several sellers offered Prime Western down in a vain attempt to attract good tonnages in their direction. The whole market gradually followed suit and spelter is now uniformly quoted at 4.30c. a lb., East St. Louis, and 4.65c., New York. Despite this decline of 5 points only 1500 tons of new business was attracted into the market, as against 2000 tons last week and 6500 tons booked two weeks earlier. At the present time spelter is greatly improved statistically on the strength of determined production restrictions in the Joplin ore area. There seems little doubt but that the market would move up quickly on the reappearance of a moderate consumer demand. Joplin producers are vindicating their curtailment threats and the restriction of the Tri-State output is now in its third week. Stocks have dropped to 18,250 tons and buyers are scouring the field to secure all of the concentrates available at \$27 and \$28 a ton. Statistics for refined metal disclose that leading Prime Western producers booked 5390 tons of spelter in June for immediate delivery at a weighted average price of 4.243c. a lb., East St. Louis, as compared with 6206 tons in May at 4.351c. During June the same producers sold 11,065 tons for subsequent delivery at 4.260c. a lb.

Lead

This market is now more quiet, but there is still a sufficient demand for August accounts to enable principal sellers to dispose of their average daily ore intakes. The steady purchasing of recent weeks can be ascribed to the belief among consumers that 3.60c. lead is a bargain, and in all probability there is some stocking in anticipation of less favorable market conditions in August. At present practically all of the July requirements have been covered and unfilled orders for August aggregate about 18,000 tons. The really depressing factor of this market is the steady accumulation of producers' stocks, which now stand at about 240,000 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	July 11	July 12	July 13	July 14	July 16	July 17
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, Eastern delivery*	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, N. Y.	51.85	51.85	51.87½	...	51.90	51.95
Zinc, East St. Louis	4.35	4.32½	4.30	4.30	4.30	4.30
Zinc, New York	4.70	4.67½	4.65	4.65	4.65	4.65
Lead, St. Louis	3.60	3.60	3.60	3.60	3.60	3.60
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Blue Eagle copper. †Refinery; price ¼c. higher in Connecticut Valley.

Quotations below cover wholesale lots, f.o.b. New York.

Aluminum, 98-99 per cent, 22.90c. a lb.
Aluminum, remelt, No. 12 (grade 3), 12.75c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb.; shot and ingot, remelt electro, 36c. a lb.
Antimony, 8.12½c. a lb. Quicksilver, per flask of 76 lb., \$75.
Brass ingots, 85-5-5-5, 8.75c. a lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.00c. to 54.00c.
Tin, bar	55.00c. to 56.00c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	17.00c.
*Seamless copper tubes	17.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	9.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.50c. to 33.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.25c.
Tin, bar	57.25c.

Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.25c.
Solder, ½ and ½	33.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy. and wire	6.25c.	7.00c.
Copper, light and bottoms	5.25c.	6.25c.
Brass, heavy	3.25c.	3.87½c.
Brass, light	2.87½c.	3.50c.
Hvy. machine composition	5.00c.	5.87½c.
No. 1 yel. brass turnings	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	2.87½c.	3.37½c.
Zinc	2.25c.	3.00c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

Reinforcing Steel

Awards 7825 Tons—New Projects 1025 Tons

Suffolk County, N. Y., 450 tons, mesh for Sunrise Highway, to American Steel & Wire Co.

Suffolk County, N. Y., 170 tons, highway, to Pittsburgh Steel Co.

Bayside, N. Y., 170 tons, high school, to Carroll-McCreary Co., Inc.

Chicago, 200 tons, hog and cattle runs for Union Stock Yards, to Calumet Steel Co.

State of Indiana, 100 tons, State highway work, to Concrete Steel Co.

State of Oregon, 525 tons, bridge over Siuslaw River, to Poole & McGonigle.

Limon, Colo., 315 tons, State bridge, to American Bridge Co.

San Francisco, 100 tons, Calaveras aerator, to Soule Steel Co.

State of Washington, 165 tons, bridge in Skagit and Island Counties, to an unnamed bidder.

Pocatello, Idaho, 125 tons, city reservoir, to an unnamed bidder.

Boulder Dam, Nev., 5500 tons, 2750 tons each to Sheffield Steel Corp. and Judson Mfg. Co.

NEW REINFORCING BAR PROJECTS

Bourne, Mass., 220 tons, bridge.

Lawrenceburg, Ind., 100 tons, post office.

Sheboygan, Wis., 225 tons, Fourteenth Street overhead bridge; Eau Claire Engineering Co., Eau Claire, Wis., low bidder.

San Francisco, 150 tons, Brannan Street sewer; bids under advisement.

Los Angeles, 170 tons, State bridge over San Gabriel River; bids under advisement.

Los Angeles County, Cal., 380 tons, material for County Flood Control District; bids soon.

Cast Iron Pipe

Stowe, Mass., has awarded 24,000 ft. of 6-in. to W. G. Fritz & Co.

Georgetown, Mass., will close bids July 25 on 685 tons of 6, 8 and 10-in.

New Bedford, Mass., asks bids until July 25 for 120 ft. of 24-in., and about 16½ tons special castings.

Vergennes, Vt., has been awarded a P.W.A. loan for a water system. Work will start about Sept. 1.

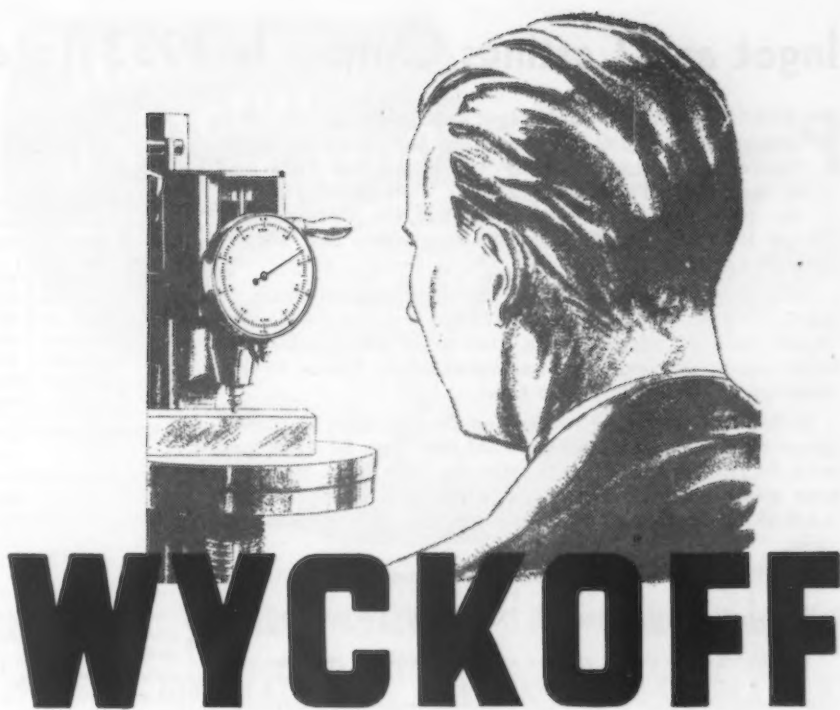
Cleveland, Okla., asks bids until July 31 for 32,000 ft. of 10-in. and smaller; also for pumping plant, filtration plant and equipment. Fund of \$164,000 has been arranged. O. F. Sewell, Pawnee, Okla., is engineer; W. R. Holway, 302 East Eighteenth Street, Tulsa, Okla., is consulting engineer.

Ponca City, Okla., asks bids until July 23 for 13,000 ft. of 27-in., and 6,000 ft. of 12-in. for water supply mains. Fund of \$560,000 has been arranged for this and other waterworks improvements, pumping station, dams, etc. W. R. Holway, 302 Eighteenth Street, Tulsa, Okla., is consulting engineer.

Muskegon, Mich., plans water pipe line in connection with new waterworks pumping station and filter plant. Appropriation of \$40,000 is available. Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

Frederic, Wis., plans water pipe line system. Fund of \$19,500 is being arranged.

Bolivar, Mo., plans water pipe line system. Fund of \$53,000 has been secured through Federal aid for this and other waterworks improvements. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.



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*products of unceasing vigilance
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Metallurgically trained men backed by modern scientific testing and inspecting facilities supervise every step in the manufacture of Wyckoff Cold Drawn Steels,—your constant assurance of those qualities of fitness and uniformity in your finished product so essential to the maintenance of present day production standards.

The facilities of both our metallurgical and mechanical departments are always available to users in solving special machining difficulties or other similar problems.

We will welcome an opportunity to serve you.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.

MILLS—Ambridge, Penna. and Chicago, Ill.

Monroe, Ohio, plans water pipe line system. Fund of \$36,000 is being arranged, including waterworks station.

Cornelia, Ga., will soon take bids for water pipe line and waterworks station and equipment. Fund of \$90,000 has been secured through Federal aid. Robert & Co., Bona Allen Building, Atlanta, Ga., are consulting engineers.

Stevensville, Mont., plans water pipe line system. Fund of \$55,000 has been arranged through Federal aid for this and waterworks station.

Green Bay, Wis., will take bids about Aug. 1 for river crossing water main requiring 1600 lin. ft. of 12-in. pipe.

Fox Point, Milwaukee P. O., Wis., has applied for Federal grant for 13,000 lin. ft. of 16-in. water main connecting with city of Milwaukee, at cost of \$78,000.

Clintonville, Wis., closes bids July 19 for 2225 lin. ft. of 6-in. class B pipe.

Gilroy, Cal., will take bids July 30 on 698 tons of 16-in.

Santa Monica, Cal., will take bids July 24 on 142 tons of 4 and 6-in.

Fallon, Nev., has received bids on 430 tons of 4 to 10-in.

LOUIS ALLIS Co. of Milwaukee, manufacturers of electric motors and similar equipment, announce a change in the location and management of their Pittsburgh office.

The company's office will be located at 537 Oliver Building and will be in charge of J. F. Rodgers.

Ingot and Castings Output in 1933 Totaled 23,232,347 Tons

PRODUCTION of steel ingot and castings in 1933 amounted to 23,232,347 gross tons, according to official figures just announced by the American Iron and Steel Institute. The total compares with 13,681,162 tons in the previous year and with 25,945,501 tons in 1931. Of the 1933 total, 22,894,286 tons was ingots and 338,061 tons was castings.

Output of alloy steel ingots and castings amounted to 1,547,183 tons, consisting of 1,475,400 tons of ingots and 71,783 tons of castings. In 1932 only 798,604 tons of alloy ingots and castings was turned out, ingots having made up 757,560 tons of the total.

Rolled iron and steel production in 1933 was 16,735,086 gross tons, compared with 10,451,088 tons in 1932 and with 19,175,894 tons in 1931. Of the 1933 total, 6,216,650 tons was plates and sheets, 2,024,095 tons was wire rods, 1,109,457 tons was structural shapes and 416,296 tons was rails.

Detailed figures are shown in the accompanying tables.

PRODUCTION OF STEEL INGOTS AND CASTINGS

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS

Years	Open-hearth			Bessemer	Crucible	Electric	Miscellaneous	Total
	Basic	Acid	Total					
1919..	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920..	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921..	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922..	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	.....	35,602,926
1923..	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	.....	44,943,696
1924..	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	.....	37,931,939
1925..	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	.....	45,393,524
1926..	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	.....	48,293,763
1927..	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	.....	44,935,185
1928..	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	.....	51,544,180
1929..	47,232,419	1,120,469	48,352,888	7,122,599	6,645	951,431	.....	56,433,473
1930..	34,268,316	780,856	35,049,172	5,035,459	2,253	612,599	.....	40,699,483
1931..	22,130,398	379,168	22,509,566	3,023,446	1,547	410,942	.....	25,945,501
1932..	11,742,682	164,648	11,907,330	1,532,076	645	241,111	.....	13,681,162
1933*	20,057,146	324,526	20,381,672	2,428,791	681	421,203	.....	23,232,347

PRODUCTION OF STEEL INGOTS

1919..	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795
1920..	30,926,393	759,102	31,685,495	8,778,107	70,536	346,956	298	40,881,392
1921..	14,864,607	290,750	15,155,357	3,977,129	6,877	84,404	317	19,224,084
1922..	27,901,190	517,045	28,418,235	5,871,565	27,561	191,057	.....	34,568,418
1923..	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	.....	43,485,665
1924..	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	.....	36,811,157
1925..	36,632,000	484,843	37,116,843	6,670,128	17,729	335,978	.....	44,140,738
1926..	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	.....	46,936,205
1927..	36,750,387	493,653	37,244,040	6,153,703	7,606	371,278	.....	43,776,717
1928..	42,818,557	454,883	43,273,440	6,591,745	6,516	453,692	.....	50,325,393
1929..	46,644,206	576,393	47,220,599	7,091,680	5,762	532,392	.....	54,850,433
1930..	33,898,518	367,181	34,265,699	5,020,588	1,563	307,418	.....	39,595,268
1931..	21,986,933	194,388	22,181,321	3,011,394	831	235,376	.....	25,428,922
1932..	11,689,495	104,794	11,794,289	1,528,544	241	141,328	.....	13,464,402
1933*	19,972,805	195,495	20,168,300	2,425,779	399	299,803	.....	22,894,286

PRODUCTION OF STEEL CASTINGS

1919..	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920..	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,442
1921..	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922..	425,981	404,767	830,748	47,733	1,045	154,982	.....	1,034,508
1923..	571,310	581,299	1,152,609	67,512	1,952	235,958	.....	1,458,031
1924..	456,518	402,901	859,419	53,437	1,377	206,549	.....	1,120,782
1925..	455,282	462,303	917,585	53,834	1,833	279,534	.....	1,252,786
1926..	480,627	505,379	986,006	43,066	2,041	326,445	.....	1,357,558
1927..	393,881	430,414	824,295	38,024	1,340	294,809	.....	1,158,468
1928..	381,926	458,590	840,516	28,450	1,253	348,568	.....	1,218,787
1929..	588,213	544,076	1,132,289	30,829	883	419,039	.....	1,583,040
1930..	369,798	413,675	783,473	14,871	690	305,181	.....	1,104,215
1931..	143,465	184,780	328,245	12,052	716	175,566	.....	516,579
1932..	53,187	59,854	113,041	3,532	404	99,783	.....	216,790
1933..	84,341	129,031	213,372	3,012	282	121,395	.....	338,061

*The figures reported include an estimate for one company which reported in previous years but has failed to report for 1933.

ALLOY STEEL INGOTS AND CASTINGS

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS, GROSS TONS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1920..	1,591,939	68,353	1,660,292	1927..	2,385,904	145,844	2,531,748
1921..	769,293	40,255	809,548	1928..	3,045,225	169,684	3,214,909
1922..	1,614,392	59,104	1,673,496	1929..	3,764,287	192,920	3,957,207
1923..	2,014,269	92,220	2,106,489	1930..	2,317,183	126,128	2,443,311
1924..	1,940,461	85,948	2,026,409	1931..	1,366,010	89,903	1,455,913
1925..	2,320,390	112,583	2,432,973	1932..	757,560	41,044	798,604
1926..	2,317,313	146,101	2,463,414	1933..	1,475,400	71,783	1,547,183

Similar statistics are not available prior to 1909.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, 1932-1933, GROSS TONS

Processes	1933			1932 Total
	Ingots	Castings	Total	
Open-hearth steel—basic.....	1,165,161	4,094	1,169,255	616,719
Open-hearth steel—acid.....	24,653	32,444	57,097	27,236
Bessemer steel.....	23,340	1,179	24,519	13,651
Crucible steel.....	50	52	102	121
Electric steel.....	262,196	34,014	296,210	140,877
Total.....	1,475,400	71,783	1,547,183	798,604

In 1933, there were 191 works in 27 States, the District of Columbia and Alaska which made alloy steel ingots or castings.

ROLLED IRON AND STEEL

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, 1893-1933, GROSS TONS

Years	Iron and steel rails	Plates and sheets	Wire rods	Structural shapes	Nail plate	All other finished rolled	Total
1893...	1,136,458	674,345	537,272	387,307	136,113	2,104,190	4,975,685
1894...	1,021,772	682,900	673,402	360,305	108,262	1,795,570	4,642,211
1895...	1,306,135	991,459	791,130	517,920	95,085	2,487,845	6,189,574
1896...	1,122,010	965,776	623,986	495,571	72,137	2,236,361	5,515,841
1897...	1,647,892	1,207,286	970,736	583,790	94,054	2,497,970	7,001,728
1898...	1,981,241	1,448,301	1,071,683	702,197	70,188	3,239,760	8,513,370
1899...	2,272,700	1,903,505	1,036,398	850,376	85,015	4,146,425	10,294,419
1900...	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1901...	2,874,639	2,254,425	1,365,934	1,013,150	68,850	4,772,329	12,349,327
1902...	2,947,933	2,665,409	1,574,293	1,300,326	72,936	5,383,219	13,944,116
1903...	2,992,477	2,599,665	1,503,455	1,095,813	64,102	4,952,185	13,207,697
1904...	2,284,711	2,421,398	1,699,028	949,146	61,601	4,597,497	12,013,381
1905...	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,015
1906...	3,977,887	4,182,156	1,871,614	2,118,772	54,211	7,383,828	19,588,468
1907...	3,633,654	4,248,832	2,017,583	1,940,352	52,027	7,972,374	19,864,822
1908...	1,921,015	2,649,693	1,816,949	1,083,181	45,747	4,311,608	11,828,193
1909...	3,023,845	4,234,346	2,335,685	2,275,562	63,746	7,711,506	19,644,090
1910...	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911...	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,039,171
1912...	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,841
1913...	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243
1914...	1,945,095	4,719,246	2,431,714	2,031,124	38,573	7,204,444	18,370,196
1915...	2,204,203	6,077,694	3,095,907	2,437,003	31,929	10,546,188	24,392,924
1916...	2,854,518	7,453,980	3,518,746	3,029,964	30,088	15,493,093	32,380,389
1917...	2,944,161	8,267,616	3,137,138	3,110,000	22,864	15,585,921	33,067,700
1918...	2,540,892	8,799,135	2,562,390	2,849,969	18,310	14,385,058	31,155,754
1919...	2,203,843	7,372,814	2,538,476	2,614,036	12,832	10,359,543	25,101,544
1920...	2,604,116	9,337,680	3,136,907	3,306,748	20,577	13,941,835	32,347,863
1921...	2,178,818	4,260,574	1,564,330	1,272,624	14,573	5,483,087	14,774,006
1922...	2,171,776	7,968,397	2,654,741	2,718,768	21,969	10,916,353	26,452,004
1923...	2,904,516	9,497,717	3,075,892	3,405,197	22,833	14,370,921	33,277,076
1924...	2,433,332	8,087,883	2,522,545	3,283,708	22,175	11,736,792	28,086,435
1925...	2,785,257	9,807,659	2,844,656	3,604,130	22,038	14,323,220	33,386,960
1926...	3,217,649	10,529,056	2,722,032	3,911,663	17,337	15,098,155	35,495,892
1927...	2,806,486	9,627,734	2,770,271	3,742,445	18,051	13,914,044	32,879,031
1928...	2,647,493	11,006,050	3,080,816	4,096,143	16,200	16,816,214	37,662,916
1929...	2,722,138	12,436,312	3,134,409	4,778,020	9,827	17,988,710	41,069,416
1930...	1,873,233	9,067,366	2,348,600	3,512,473	*	12,711,335	29,513,007
1931...	1,157,751	6,039,581	1,844,620	2,062,858	*	8,071,084	19,175,894
1932...	402,566	3,443,308	1,186,181	937,228	*	4,481,805	10,451,088
1933†	416,296	6,216,506	2,024,095	1,109,457	*	6,968,588	16,735,085

June Machine Tool Sales Lowest for the Year

REFLECTING the lack of confidence on the part of private investors, which is so seriously handicapping recovery in capital goods, the machine tool order index, as reported by National Machine Tool Builders' Association, dropped to 35.3 for June. This is the lowest for any month so far this year and is approximately one half of the high month of last December.

Labor troubles played an important part in dampening buyers' enthusiasm, and also the increasing uncertainty as to the future course of business and its relation to Government. Orders for foreign shipment have also been adversely affected by tightened quota restrictions abroad and by difficult exchange situations. Gradual slackening of tool buying from Government departments has been another factor.

Detroit Scrap Market Shows No Improvement

DETROIT, July 17.—The local scrap market continues sluggish with consumers showing slight interest. Prices are hovering around the low levels which have prevailed for several weeks. Restrictions on boat shipments of scrap have been relaxed somewhat by steel mills but a substantial amount of material scheduled to be moved to Lake Erie points by water still is tied up in local yards.

British Collieries Using More Steel

THE increasing use of steel in mines in Britain is shown by reports of State Inspectors which have just been issued by the Mines Department. In Scotland nearly 16 miles of working faces and 588 miles of roadway were supported by steel in 1933, and the inspectors state that a steady advance is being made in this respect. Progress is also being made in the Northern Division, where 170 miles of roadway were supported by steel, and 203,000 steel props and 200,000 steel straps were in use at the end of last year.

Electrical Conduit with Anti-friction Interior

A NEW type of electrical conduit which has an interior surface that greatly reduces wire pulling friction has been developed by the Electrical Division of Steel & Tubes, Inc., Cleveland. The inside of the conduit, which is called Electrunite

like
a doctor's
prescription



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AERICAN MONORAIL specializes in custom-built systems that cut production costs because they are designed to fit individual needs.

The engineering staff of this company includes several of the original pioneers in the field of industrial material handling. Their knowledge and experience are available to you in the form of a specialized conveying sys-

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FABRICATED TO FIT

Steeletubes, is processed, prior to forming and welding, so that the entire surface is covered with small, round, raised knobs which produce what the manufacturer calls a ball-bearing surface. Tests have shown that the surface reduces the surface friction by as much as 30 per cent and in addition cuts down the time and so-called jamming in the pulling of cables.

RECOMMENDED practices for oxy-acetylene welding of corrosion resisting steels, based on the comprehensive investigations of Union Carbide & Carbon Research Laboratories,

Inc., are given in a booklet on "Ox-welding Corrosion-Resisting Steels," published by the Linde Air Products Co., 30 East Forty-second Street, New York.

Because of the fact that currently used chromium steels have certain idiosyncrasies depending on the varying proportions in the steel, not only of chromium, but of other alloying agents which affect the material's weldability, stainless steels are divided into eight groups, each of which has similar welding properties. For each group there is a discussion of welding procedures, as well as of treatment before and after welding, where this is necessary.

"HERCULES" RED-STRAND WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.



A GIANT
in Strength and
Endurance

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NEW YORK

CHICAGO

DENVER

SAN FRANCISCO

Fabricated Structural Steel

Lettings Light—New Projects in Better Volume

AWARDS of structural steel, at 8500 tons, are the lowest since the first week in April and compare with 20,300 tons last week. The only booking of size is 2035 tons for the M Street bridge in Sacramento, Cal. New projects of 10,400 tons compare with 7500 tons in the previous week and 8950 tons two weeks ago. Among fresh inquiries are 4000 tons for a railroad bridge at Buzzards Bay, Mass., and 1000 tons for a high school at Utica, N. Y. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

New Bedford, Mass., 200 tons, school addition, to John E. Cox Co., Fall River, Mass.

Dover, N. H., 190 tons, municipal building, to New England Structural Co.

Littleton, N. H., 410 tons, Connecticut River bridge, State highway project 263, to Phoenix Iron Works.

New York, 120 tons, Seton hospital, to Ingalls Iron Works Co.

Rome, N. Y., 245 tons, building for Revere Copper & Brass, Inc., to Utica Steam Engine & Boiler Works.

State of New Jersey, 218 tons, Central Railroad of New Jersey and Lehigh Valley grade crossing elimination, to American Bridge Co.

Finderne, N. J., 265 tons, State highway bridge, to American Bridge Co.

Clymer, Pa., 140 tons, State highway bridge, to an unnamed fabricator.

Irvine, Pa., 400 tons, addition for National Forge & Ordnance Co., to Rogers Structural Steel Co., Corry, Pa.

THE SOUTH

Hawks Nest, W. Va., 190 tons, girder spans, to Jones & Laughlin Steel Co.

Fort Pierce, Fla., 850 tons, pre-cooling plant, to Ingalls Iron Works Co.

CENTRAL STATES

Gary, Ind., 150 tons, gas producers for Illinois Steel Co., to Arthur G. McKee & Co.

Monticello, Ind., 350 tons, bridge, to Central States Bridge & Structural Co., Indianapolis.

Ashtabula, Ohio, 150 tons, sheet steel piling for Coast Guard bulkhead wall, to Carnegie Steel Co.

Vanderbilt, Mich., 160 tons, State highway bridge, to R. C. Mahon & Co.

Weston, Mich., 800 tons, bridge, to Wisconsin Bridge & Iron Co.

Detroit, 185 tons, machine shop addition for Chevrolet Motor Co., to Whitehead & Kales Co.

St. Paul, Minn., 325 tons, building for Jacob Schmitt Brewing Co., to St. Paul Structural Steel Co.

Champaign, Ill., 250 tons, high school, to Edwin Pratts & Sons Co.

Niles Center, Ill., 500 tons, two bridges, to American Bridge Co.

Palisades, Ill., 250 tons, bridge, to Duffin Iron Works.

Milwaukee, 200 tons, building, to Lakeside Bridge & Steel Co.

WESTERN STATES

Sacramento, Cal., 2035 tons, M Street bridge over Sacramento River, to Consolidated Steel Corp.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Buzzards Bay, Mass., 4000 tons, railroad bridge.

Utica, N. Y., 1000 tons, East high school.

Cold Spring, N. Y., 200 tons, State school.

Albany, N. Y., 295 tons, store house for Albany Port District Commission.

Jamestown, N. Y., tonnage unstated, Erie Railroad bridge.

Rochester, N. Y., 830 tons, Ellwood Avenue bridge, to be readvertised.

Buffalo, 500 tons, police headquarters.

Pennington, N. J., 190 tons, State highway bridge.

Bradford, Pa., 200 tons, junior high school.

SOUTH AND SOUTHWEST

Wheeling, W. Va., 160 tons, State highway bridge.

State of Texas, 225 tons, bridges.

Nogales, Ariz., 100 tons, immigration building.

Greenville, Miss., 280 tons, building for United States Gypsum Co.; H. K. Ferguson Co., Cleveland, general contractor.

CENTRAL STATES

Detroit, 800 tons, extension to Briggs Mfg. Co. plant.

Ludington, Mich., 100 tons, bridge.

Cleveland, 500 tons, addition for Fisher Body Co. plant.

Terre Haute, Ind., 275 tons, warehouse.

Sheboygan, Wis., 150 tons, Fourteenth Street overhead bridge; Eau Claire Engineering Co., Eau Claire, Wis., low bidder.

State of Missouri, 250 tons, highway projects; bids to be opened at Jefferson City, July 20.

WESTERN STATES

Boulder Dam, 500 tons, 17 cranes; Shaw Box Co., low bidder.

Stockton, Cal., 100 tons additional, wharf and transit shed; bids taken July 17.

State of California, 1000 tons, dock sheds.

FABRICATED PLATE

AWARDS

East Hartford, Conn., 120 tons, 30,000-barrel tank for American Coal Co., to Chicago Bridge & Iron Works.

Baton Rouge, La., 805 tons, tanks and standpipe for Solvay Process Co., to an unnamed Southern fabricator.

NEW PROJECTS

Georgetown, Mass., 100 tons, standpipe.

Tacoma, Wash., 1870 tons, Green River gravity pipe line; Beall Pipe & Tank Corp., low bidder on steel pipe.

Limon, Colo., 100 tons, elevated tank; bids July 24.

Stockton, Cal., 100 tons, boiler for County hospital; bids under advisement.

Railroad Equipment

Seaboard Air Line is inquiring for 100 phosphate cars.

Mexican Railroad is inquiring for 20 automobile cars and 30 box cars.

Rendel, Palmer & Tritton, 55 Broctury, Westminster Street, S.W., London, England, engineers, representing Trade Commissioner for Mysore, India, ask bids until Aug. 6 for two tank locomotives.

Board of Transportation, New York, is asking for tenders until July 20 for 6000 tons of track rail, 375 tons of guard rail and miscellaneous spikes, bolts and tie plates.

United Fruit Co. has purchased 700 tons of good conditioned 80-lb. relaying rails and other railroad equipment for its lines in Cuba, and is negotiating with New England railroads for three locomotives.

South African Machinery Trade in 1933

WITH the abandonment of the gold standard at the end of December, 1932, and the subsequent linking of the South African pound to British sterling, immediate benefits accrued to the country's primary producers, according to the Machinery Division of the Department of Commerce. This move was of especial importance to the gold mining industry and the producers entered a period of expansion and enjoy greatly increased profits. The effects were widespread and coupled with greatly improved prices of wool, hides, and skins and the revival of important building and construction projects, trade conditions improved steadily.

Machinery Imports Show 19 Per Cent Gain

An analysis of the imports during the calendar year 1933, of thirty important classes of machinery used in various kinds of industries revealed the fact that twenty-five showed values higher than those recorded in the calendar year of 1932. The total value of the imports of these thirty classes of machinery in 1932 was £2,426,584, and in 1933 was £2,889,909. The gain amounted to some 19 per cent.

Virtually every important class of machinery for which import statistics are available records the United Kingdom as the principal supplier of the South African market. Of the thirty groups analyzed, twenty-five show the United Kingdom as the leading supplier. This condition has existed for many years, yet manufacturers of other countries are conducting a sizable trade with South Africa in many lines and several important American manufacturers, supplying the market from branch plants in England, are contributing to the volume of trade accredited to the United Kingdom.

The analysis of imports of thirty classes of machinery further reveals the fact that of the total valuation of about £2,890,000 the United States may be credited with approximately £467,000 or 16 per cent. These figures compared with figures for 1932 show that machinery manufacturers in the United States have improved their position by some £151,000 during 1932. In about half of the classifications the United States ranks as the second most important source of supply, and in two classes, namely, the large and inclusive "Machinery, N.E.E." and "Traction Engines" the United States leads as an overseas supplier.

The British Government has decided to grant for one year a £2,000,000 subsidy to British tramp shipping. This action was taken in an effort to abolish foreign subsidies and to create greater employment of British vessels.

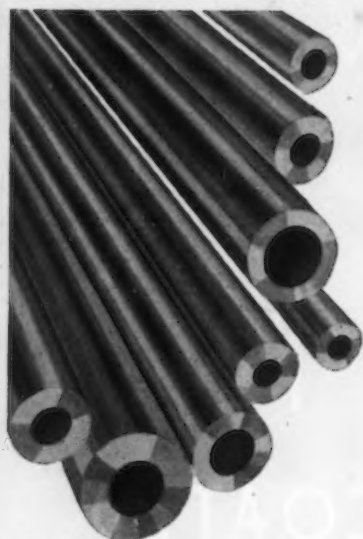
BUNDYWELD STEEL TUBING *is* COPPER-COATED *inside and outside*

Bundyweld Steel Tubing is rolled from strip steel which has been previously copper-coated on two sides, and is then Copper-Hydrogen-Electric-Welded into a solid structure. This copper coating gives Bundyweld Tubing very desirable corrosion-resisting properties. Because of its ability to withstand vibration, its great strength, and recuperative properties, it has been proven superior for such installations as gas, oil, brake, and vacuum lines. It has the strength of steel with sufficient ductility to permit easy fabrication.

The reducing atmosphere of the welding process leaves the tube absolutely clean and free from scale. It may be heat-treated without injury.

Both I. D. and O. D. are held to tolerances of .003". Uniformity of wall thickness is an outstanding feature. Bundyweld tubing is furnished in base sizes of $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", and $2\frac{1}{4}$ " in various wall thicknesses. It can be redrawn to any odd size required. Furnished in lengths or completely fabricated, either with or without fittings. Send blue prints or samples for quotations. Complete information upon request.

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TOOL STEEL TUBING

NON-SHRINK
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for RING DIES
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*Manufacturers of BISCO Tungsten Carbide
drawing dies for wire, rod and tubing.*

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▲▲ OBITUARY ▲▲

EDMUND KEARSLEY SWIGART, chairman of the board of the Oilgear Co., Milwaukee, and senior vice-president, Bucyrus-Erie Co., South Milwaukee, died of heart disease on July 7 while on a fishing trip in northern Wisconsin. He was born in Bucyrus, Ohio, April 16, 1867, and after graduation from Toledo High School was in the railroad mail service for 10 years. He joined the Bucyrus-Erie Co. in 1891 and 10 years later was made secretary and treasurer. Mr. Swigart was made a joint managing director of the company in 1910 and the following year senior vice-president. He founded the Oilgear Co. in 1921 and was chairman of the board at the time of his death. His son, HARRY MARSHALL SWIGART, is president of the Oilgear Co.

◆ ◆ ◆

CARL L. PETERS, president of Geiger & Peters, Inc., died July 8 in Indianapolis. He was a founder of the firm, which has been in structural and ornamental fabricating business in Indianapolis for the past 28 years.

◆ ◆ ◆

NATHAN L. MILLER, of Birmingham, former Lieutenant Governor of Alabama and president of the American Bolt Co. at the time it was sold to the Lake Erie Bolt & Nut Co., died July 7 after a long illness.

◆ ◆ ◆

WILLIAM L. SHEPARD, a retired mechanical engineer, died at his home in Clinton, Conn., on July 8, aged 78 years. For a number of years he

was active in the operation of the Elmwood, Conn., plant of the Whitlock Coil Pipe Co.

◆ ◆ ◆

OLE EVINRUDE, prominent Milwaukee industrialist and originator of the outboard motor now in use internationally, died July 12, aged 57 years. He was born in Norway and came to America in early youth. After a number of years spent in machine shops and toolrooms of large Milwaukee manufacturers, Mr. Evinrude organized the Evinrude Motor Co. in 1909 to manufacture the first outboard engine. He sold the business in 1913, but in 1920 organized



E. K. SWIGART

the Elto Outboard Motor Corp. In 1929 the Evinrude and Elto companies were merged with the Lockwood Motor Co., Jackson, Mich., as the Outboard Motors Corp. of Milwaukee, with Mr. Evinrude as president. An only son, Ralph S. Evinrude, is a director of the company.

◆ ◆ ◆

WILLIAM J. HAMPTON, former vice-president and general manager and director of Spang, Chalfant & Co., Inc., Pittsburgh, died in a hospital in that city on July 15, aged 62 years. He was born in Middletown, Pa., in 1872, and came to Pittsburgh in 1904 to take charge of the Spang, Chalfant mills. He retired from the company about two years ago.

◆ ◆ ◆

L. W. HOSTETTLER, manager of alloy sales, Allegheny Steel Co., Brackenridge, Pa., died last week as a result of an automobile accident near Waukegan, Ill. He was 50 years old. For more than 20 years he had been associated with the Allegheny Steel Co., and had been connected prior to that with the Youngstown Pressed Steel Co.

How Fireproof Steel Stood the Chicago Fire

ON May 19, 1934, a fire broke out in the stock yards at Chicago, doing a total damage estimated at eight million dollars before it was finally put under control. The fire involved dozens of owners and tenants—for the most part business houses, and but a few residential properties were involved. Engineers representing the American Institute of Steel Construction visited the site immediately after the fire and carefully examined the damage done to the buildings. Their conclusions, summarized as follows, will be of interest to industrialists, architects and engineers who must consider the possibility of fire damage and building replacement.

In general, concludes the report, steel frames with combustible roofs and no fireproofing were seriously damaged or a total wreck. Reinforced concrete structures were severely damaged and can not be repaired to their former condition. Fireproof steel structures came through with no damage to the steel frame and, with the fireproofing repaired, will be as good as ever.

Foundry Equipment Orders Increase

The index of net orders for foundry equipment during June, with 22 makers reporting, was 70.4, as compared with 66.5 in May, and with 45.5 in June last year.

United States Progress in Applications of Steel Reviewed.

(Concluded from Page 34)

cent of the City of New York buildings are not fire-proof. Not only the fire-proofing but all building restrictions on skyscrapers are most rigid. The light occupancy building, with steel joists, steel floors, steel casements, steel built-in cabinets, expanded steel and lath and other steel equipment can be built at prices which permit of reasonable rentals. A large latent demand exists for this type of structure and the engineering designs for them have been greatly improved and worked out in such form as to make them reasonable in price.

Welding Has Been Aid

Despite the depression, the construction industry has produced during the past year or planned to produce some outstanding structures. The Sunnyvale Hangar, built for the Navy in California, is now occupied. It has the largest floor space of any structure heretofore built. It is a monument to the possibilities of steel construction. Furthermore, it contains 22,000 sq. ft. of flat steel plate floor, a type of construction aggressively developed only within the past few years.

Notwithstanding the decreased volume of building operations due to the depression, the welding of structural steel has made noticeable progress. Because of the depression there has been more attention paid to the rehabilitation of existing steel bridges and other structures, and in this work welding has been used to an increasing and marked extent. Due to the development and increased use of coated welding rods during 1933, difficulties heretofore existing on account of the lack of satisfactory ductility of weld metal for welding structural steel have been removed, thus paying the way for an increased percentage of welding use against riveting.

A most noted application of welding in the industry has been in the production of machinery of all kinds made of rolled steel torch-cut and welded. It is today possible to torch-cut steel with a precision comparable to the finest carpentry in lumber. Welding will approximate the work of the finest joiners. Equipment of rolled material is stronger than cast iron or cast steel, and is being designed to result in a more economical use of material. It is confidently estimated that from three to five million tons of rolled steel will ultimately be used yearly in this type of work.

Better methods are being developed in all industries. Steel, being a basic commodity, must prepare itself to

meet these new conditions. Therefore research in engineering design has been particularly active not only in the field of construction but in all the fields in which steel is used as raw material. But to meet these new engineering requirements the product must be made to conform. With that in mind, the effort has been to improve the metallurgical practices of the industry. Within the immediate past not only have improved standards for special steels been adopted, but improved specifications for the ordinary structural steels have been put out. New specifications for rivet steel, improved rails, sheets, wire and other commodities were offered. All

promise greater economies and larger service. Steel has never failed to meet its requirements; the best brains in the country are determined that it will never fail to meet its opportunities in the future.

Tanner & Co., 409-13 South Pennsylvania Street, Indianapolis, tinners' supplies, sheet iron products, etc., has begun a new warehouse steel service for hot rolled bars and shapes, cold rolled bars and allied specialties, expanding facilities for development of new line. Henry C. Thomson is president and general manager.

Those Old ERIES Were Good Buys



Take a minute to check up on that statement, using your own figures — the hours they've run, the overhead they've earned for you. You'll find they've repaid their cost many times over. They're written off your books; they ought to be out of your plant. They were good buys.

We're telling you that new ERIE Hammers are better buys—enough better that you can't afford not to put them in. Just write us that you are interested and we will show you why it will pay. No obligation, of course.

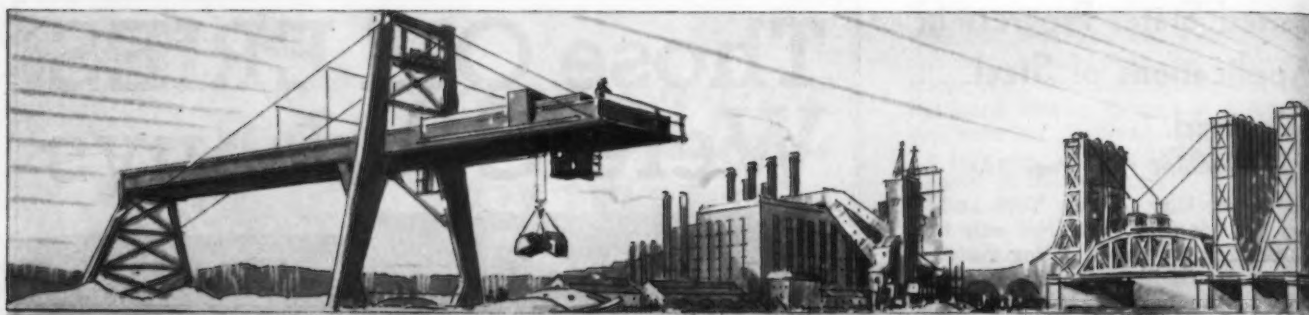
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PLANT EXPANSION AND EQUIPMENT BUYING

Automotive Machine Tool Purchases Expected to Be Lighter This Year

WITH really heavy purchases of machine tools and equipment by the automotive industry still postponed, the opinion is growing in the Detroit area that such buying will be relatively less than in former periods. Automobile builders hesitate to make large expenditures while uncertainty regarding further Federal legislation exists and also plan to make comparatively minor model changes for 1935 cars. Changes may be confined largely to body refinements, and heavy expenditures for presses are in prospect. In addition to the \$800,000 spent for this purpose as reported last week, additional press orders are in sight during the next month.

Machine tool demand from other sources continues rather quiet, although purchases of single tools and repair parts are maintained. New inquiry is light, but a number of projects are still before the trade on which action is being postponed. Approximately 120 tools will be required by the Lane Technical High School at Chicago, but no action has yet been taken in spite of the fact that the appropriation was made some time ago.

◀ NEW ENGLAND ▶

Great Northern Paper Co., Millinocket, Me., has plans for new hydro-electric generating plant. Cost over \$75,000 with equipment. **H. J. Deutschbein Co., Inc.**, 350 Fifth Avenue, New York, is consulting engineer.

Hershey Metal Products Co., Derby, Conn., has been organized by Paul H. and Aaron S. Hershey, both of Orange, Mass., to manufacture tools and other metal products.

International Silver Co., Meriden, Conn., manufacturer of plated ware, etc., has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, Hartford, Conn., for one-story addition to plant M, Wallingford, Conn. Cost about \$30,000 with equipment.

Cambridge Auto Forge, Inc., Cambridge, Mass., has been organized by Alwin A. Klauer and Fred J. Steeves, 156 Welles Avenue, Dorchester, to manufacture automobile parts and equipment.

Tide Water Oil Co., 1222 Statler Building, Boston, has plans for new bulk oil storage and distributing plant at Revere, Mass., with steel tanks, boiler house, etc. Cost about \$75,000 with equipment. Headquarters are at 17 Battery Place, New York.

◀ NORTH ATLANTIC ▶

Solvay Process Co., 61 Broadway, New York, manufacturer of alkalis, etc., with main plant at Solvay, Syracuse, N. Y., has let general contract to United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, for initial units for new branch plant at Baton Rouge, La., to include power house, pumping station, machine shop and other mechanical departments. Completion is scheduled early next spring. Cost about \$4,500,000 with machinery. Company is a subsidiary of Allied Chemical & Dye Corp., same address, New York.

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until Aug.

6 for five acetylene gas buoys complete with illuminating apparatus, from 6 ft. to 8 ft. diameter.

Municipal Department of Docks, Pier A, North River, New York, plans new two-story steel shed on existing concrete dock at Pier 32, Canal Street, with installation of conveying, loading and other equipment. Fund of \$2,020,000 has been secured through Federal aid.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for ratchet screw drivers (Schedule 2897) and quantity of grommet-inserting dies (Schedule 2898) for Brooklyn, Sewall's Point and Mare Island Navy yards; compound lever type bolt clippers (Schedule 2889) and anchor shackles, wire rope, wrought iron hooks, thimbles, etc. (Schedule 2892) for Brooklyn, Sewall's Point, Mare Island and Puget Sound yards; until July 31, tungsten hacksaw blades (Schedule 2884) for Brooklyn and Mare Island yards.

Electra Protection Co., Inc., Albany, N. Y., has been organized by Howard L. Hutchins, 200 Lancaster Street, Albany, and Lambert Dreis, 7 Herber Avenue, Elmsire, N. Y., to manufacture lightning protection devices and equipment.

New York Edison Co., 4 Irving Place, New York, has filed plans for one-story coal storage and distribution building on East Fourteenth Street, 119 x 322 ft. Cost \$150,000 with equipment.

Standard Air Conditioning, Inc., New York, has been organized by officials of American Radiator & Standard Sanitary Corp., 40 West Fortieth Street, New York, to take over air-conditioning division of last noted company and operate as a subsidiary. New company will be closely allied with Campbell Metal Window Corp., Bush and Hamburg Streets, Baltimore, another unit of parent organization. Fowler Manning is president of new company.

Common Council, Rockville Center, L. I., plans new municipal electric light and power

plant. Cost \$260,000 with equipment. Federal financing has been arranged.

Department of Sanitation, Municipal Building, New York, plans new municipal sewage disposal works on Ward's Island, with power house, pumping station and other mechanical departments. Cost about \$25,000,000, including station machinery, as well as tunnels and connecting lines in Manhattan and Bronx. Financing will be arranged through Federal aid.

City Council, Woodbury, N. J., plans new electric-operated pumping plant for municipal waterworks. Cost \$50,000 with machinery. Federal financing has been secured.

Borough School Board, Mountain Lakes, N. J., Fred A. Broad, president, plans manual training department in new junior and senior high school. Bids will be asked soon on general contract. Fund of \$524,000 has been arranged.

Kraft Machine & Tool Co., Newark, N. J., has been organized under direction of David E. Feldman, 11 Commerce Street, representative, to operate a general machine shop and tool works.

Rancocas Distilleries, Inc., Maple Shade, N. J., care of Clifford H. Shivers, 105 South Twelfth Street, Philadelphia, architect, has let general contract to Murphy Quigley Co., 1518 Sansom Street, Philadelphia, for new distillery at first noted place, comprising three main units. Cost over \$60,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 31 for rough machined steel forgings (Schedule 2933), windlasses and steering gears, and spare parts (Schedule 2853), steel turret rollers (Schedule 2935) for Philadelphia and Brooklyn Navy yards.

Independent Mfg. Co., Aramingo Avenue and Wheatheaf Lane, Philadelphia, manufacturer of greases, oils, etc., has asked bids on general contract for addition. Cost over \$40,000 with machinery.

Constructing Quartermaster, Middletown Air Depot, Middletown, Pa., asks bids until July 23 for complete gasoline fueling system at local airport (Circular 1).

◀ SOUTHWEST ▶

City Council, Cushing, Okla., plans early call for bids for new municipal electric light and power plant, about 2300-hp. capacity, using Diesel engine-generator units and auxiliary equipment. Fund of \$350,000 has been secured through Federal aid. **W. R. Holway**, 302 East Eighteenth Street, Tulsa, Okla., is consulting engineer.

M. K. Goetz Brewing Co., St. Joseph, Mo., has let general contract to Lonsdale Brothers, Telephone Building, Kansas City, Mo., for new three and six-story and basement plant, 105 x 350 ft., at Seventeenth Street and Indiana Avenue, last noted city. A one-story automobile service, repair and garage unit, 72 x 82 ft., will be built. Cost about \$450,000 with equipment. **George L. Lehle**, 111 West Washington Street, Chicago, is architect and engineer.

United States Engineer Office, Kansas City, Mo., asks bids until July 27 for tools, wire cutter, wrenches, hose, nozzles and kindred equipment (Circular 6).

City Council, Ponca, Okla., asks bids until July 23 for motor-driven pumping machinery and accessories, pipe lines, etc., for municipal waterworks. **W. R. Holway**, 302 East Eight-

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The BULLARD Company Use and Recommend SUNOCO as Do Many Other Leading Machine Tool Manufacturers

For more than half a century the Bullard Company, Bridgeport, Conn., has built and operated machine tools. As a means of increasing production and reducing cost, they use Sunoco Emulsifying Cutting Oil in their own plant; and recommend it to the operators of the machine tool equipment they manufacture.

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Like Bullard, many more leading Machine Tool Manufacturers use and recommend Sunoco. They find it reduces "down time" for resharpening and replacing cutting tools; permits increased speeds and feeds, and decreases the number of rejects... all important factors when estimating productive capacity per machine and in figuring costs.

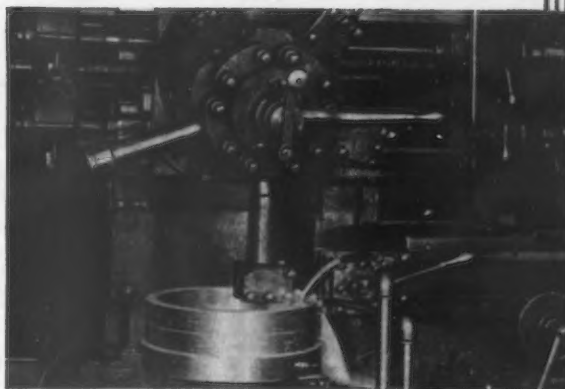
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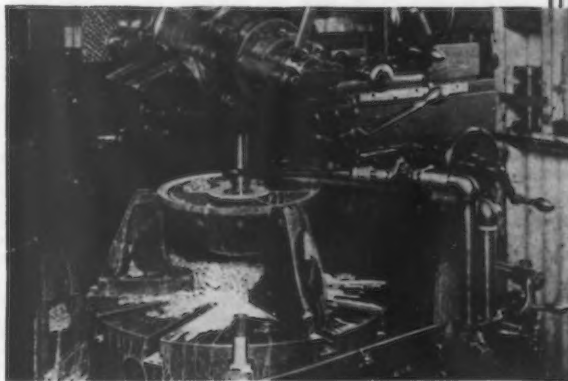
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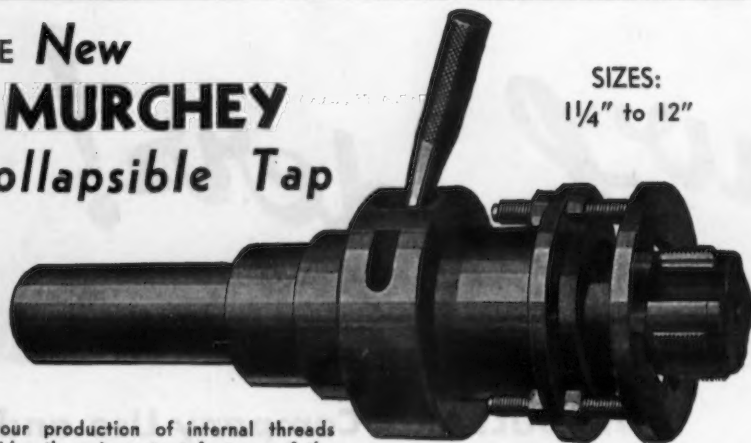
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THE New MURCHEY Collapsible Tap



SIZES:
1 1/4" to 12"

In your production of internal threads consider these important features of the new Murchey Type "C" Collapsible Tap.

1. By removing the handle the same tap may be operated in a fixed position as on turret lathes or for rotating applications as on drilling machines.

2. Collapsing is performed by a cam

and rollers—preventing the chasers from binding due to friction.

The chasers are collapsed positively as they move in hardened "T" slots on the center pin.

4. Chasers may be quickly removed merely by sliding back the outer shell.

MURCHEY MACHINE & TOOL CO.,

951 Porter St.
Detroit, Mich.

centh Street, Tulsa, Okla., is consulting engineer.

Board of Education, Library Building, Kansas City, Mo., plans manual training department in new multi-story high school at Swope Parkway and Meyer Boulevard, for which Wight & Wight, First National Bank Building, are architects. Cost about \$600,000.

Colorado River Co., San Antonio, Tex., care of R. W. Morrison, San Antonio, recently organized, plans new hydroelectric generating plant in connection with completion of Hamilton dam on Colorado River, partially completed, and on which construction has been deferred for several months. Transmission lines, substations and switching stations will be built. Fund of \$4,500,000 has been secured through Federal aid.

Common Council, Kenedy, Tex., has called special election on July 24, to approve bonds for \$161,500, fund to be used for new municipal electric light and power plant.

◀ SOUTH ATLANTIC ▶

United States Engineer Office, Savannah, Ga., asks bids until July 23 for three cast-steel machined pedestals and four cast-steel machined bearings (Circular 4).

Board of Public Works, Atlanta, Ga., plans rebuilding part of machine and forge shop and municipal asphalt plant recently destroyed by fire. Loss close to \$50,000 with equipment.

Belcher Oil Co., Port Everglades, Fla., has authorized addition to bulk oil storage and distribution plant, about 80,000 bbl. capacity, to double present facilities. Cost over \$40,000 with steel tanks and equipment.

◀ WASHINGTON DISTRICT ▶

Republic Distillers, Inc., 802 Schmidt Building, Cincinnati, has plans for extensions and improvements in Trimble Distillery, Carrollton, Md., including new buildings and equipment, with one-story power house. Cost over \$150,000 with machinery. Carl J. Kiefer, Schmidt Building, Cincinnati, is architect and engineer.

Purchasing Officer, Department of Interior, Washington, asks bids until July 24 for one double drum reversible hoist.

General Purchasing Officer, Panama Canal, Washington, asks bids until July 23 for stranded copper cable, copper wire, rubber insulated cable, magnet wire, rigid steel conduit, eight transformers, toggle switches, 36 electric drills, six steam pumps, copper wire

cloth, steel wire cloth, chain shackles, panel boards, fuses and other equipment (Schedule 2977); until July 24, one 18-in. motor-driven lathe, twist drills, dies, hacksaw blades, gas engine lubricators, chopping axes, electric lighting fixtures and other supplies (Schedule 2978).

Alpha Portland Cement Co., Easton, Pa., has filed plans for new three-story storage and distributing branch plant at Fifteenth and H Streets, N. E., Washington. Cost about \$25,000 with equipment.

Board of District Commissioners, District Building, Washington, plans manual training department in new multi-story junior high school on Sixteenth Street, S. E., Anacostia, for which bids are being asked on general contract until July 31. Cost \$490,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 24 for axes, hammers, hatchets and sledges (Schedule 2869), wood boring bits, chisels and knives (Schedule 2880) for Eastern and Western Navy yards.

◀ BUFFALO DISTRICT ▶

Board of Education, 801 City Hall, Buffalo, plans manual training department in new multi-story Kensington high school, for which bids are being asked on general contract until Aug. 14. Cost over \$500,000. Financing has been arranged. Bureau of School Architecture, Board of Education, 816 City Hall, is architect.

Blackstone Mfg. Co., Inc., Jamestown, N. Y., has been organized under direction of John E. Durkin, 31 Chestnut Street, representative, to manufacture electric washing machines, ironers, parts, etc. Company will take over local organization of same name.

Common Council, Lockport, N. Y., has plans for new municipal incinerator plant, with conveyors, loaders and other mechanical equipment. Cost \$60,000 with machinery. Financing has been arranged.

◀ WESTERN PENNA. ▶

O. Hommel Co., 211 Fourth Avenue, Pittsburgh, manufacturer of metallic paints, bronze powder, etc., with main plant at Carnegie, plans new one-story plant, 140 x 150 ft. Cost over \$50,000 with equipment.

American Austin Car Co., Inc., Butler, Pa., manufacturer of small automobiles and parts, is arranging for reorganization, with early resumption of operations. Improvements will be made, following shut-down of several weeks.

Common Council, Chester, W. Va., Joel B. Taylor, mayor, is considering erection of new municipal electric light and power plant. Cost over \$100,000 with equipment. Financing will soon be arranged.

Common Council, Matewan, W. Va., plans installation of pumping machinery, pipe lines, valves, fittings, etc., for new municipal waterworks. Federal fund of \$55,000 has been secured.

◀ SOUTH CENTRAL ▶

Kennebec Distillery, Frankfort, Ky., care of Carl J. Kiefer, Schmidt Building, Cincinnati, architect and engineer, has let general contract to Perkins Brothers Construction Co., Frankfort, for extensions and improvements. Cost over \$150,000 with machinery.

City Council, Warsaw, Ky., asks bids until July 23 for motor-driven pumping machinery and accessories, 50,000-gal. elevated steel tank and tower, pipe lines, etc., for municipal waterworks. C. N. Harub Engineering Co., American National Bank Building, Nashville, Tenn., is consulting engineer.

City Council, Shreveport, La., asks bids until July 25 for new municipal incinerator plant. Fund of \$180,000 has been arranged. Jones, Roessle, Olschner & Wiener, Shreveport, are consulting engineers.

Southern States Sugar Refining Co., Jackson, Miss., care of Col. James Walton, Jackson, vice-president, plans early erection of new sugar refinery in northeastern part of State. Cost about \$75,000 with equipment.

Tennessee Valley Authority, Knoxville, Tenn., is arranging for purchase of lines and system of Alabama Power Co., Birmingham, at Decatur, Hartselle, Russellville, Cherokee, Sheffield, Ala., and other neighboring communities, totaling 13. Extensions and improvements will be made, including transmission lines for connection with hydroelectric generating plant of TVA at Muscle Shoals, Ala. Cost over \$1,000,000.

Common Council, Tompkinsville, Ky., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal waterworks. Fund of \$50,000 has been secured through Federal aid.

◀ OHIO AND INDIANA ▶

Anton Zverina, 12210 Miles Avenue, Cleveland, has let general contract to Paugh & Brown, 670 Cedar Avenue, for new one-story machine shop, 50 x 101 ft. Cost about \$25,000 with equipment. A. E. Lowe, 1291 East 133rd Street, is engineer.

City Council, Gallon, Ohio, plans extensions and improvements in municipal electric light and power plant, to include new equipment. Cost about \$160,000. Financing has been arranged. William C. Kammerer & Associates, 823 Prospect Avenue, Cleveland, are consulting engineers.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until July 25 for 120 receptacle assemblies, marker beacon, etc. (Circular 3).

City Council, Dover, Ohio, plans new municipal electric light and power plant. Cost \$330,000 with machinery, also extensions and improvements in waterworks, including pumping machinery and accessories, pipe lines, etc. Cost \$59,000. Financing is being arranged for both projects.

Inland Mfg. Co., 15 Coleman Street, Dayton, Ohio, manufacturer of automotive and mechanical refrigeration products, a subsidiary of General Motors Corp., will take bids at once on general contract for one and two-story and basement addition, 150 x 400 ft. Cost about \$325,000 with equipment. Smith & Chamberlin, Callahan Bank Building, are architects; Hillsmith & Co., 108 East Third Street, are engineers.

Department of Water, Springfield, Ohio, Robert E. Price, superintendent, plans installation of pumping machinery and auxiliary equipment, water-softening and purification machinery, pipe lines, fittings, etc., for extensions and improvements in municipal waterworks. Fund of \$1,462,000 is being arranged.

Standard Register Co., 107 Campbell Street, Dayton, Ohio, manufacturer of manifold registers and equipment, will soon begin superstructure for two-story addition, 60 x 175 ft., for which general contract recently was let to I. F. Weber & Co., Commercial

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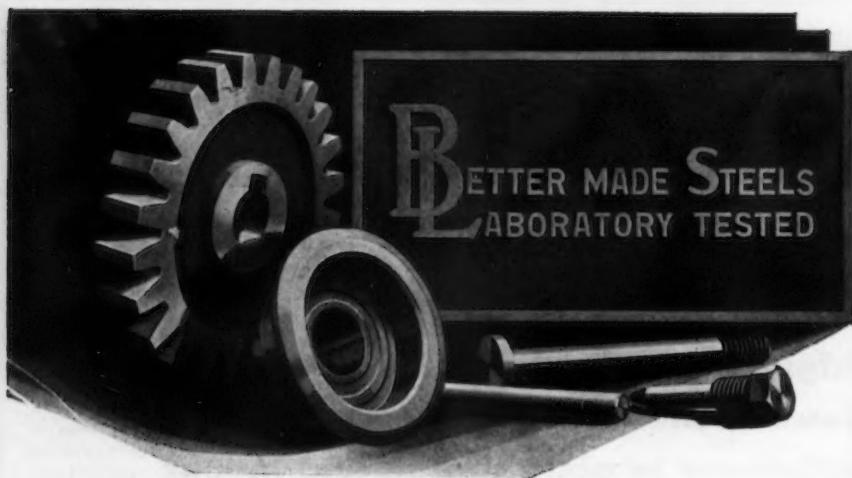
ing to the word "construction." Under the Austin method it embraces — layout, design, engineering, construction and equipment — all grouped under the term "Undivided Responsibility"... yet so organized that the same engineering skill is applied to single industrial structures as to layout, engineering and building a complete new plant.

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Building. Cost about \$40,000 with equipment. Smith & Chamberlin, Callahan Bank Building, are architects.

City Council, La Porte, Ind., plans installation of pumping machinery and accessory equipment, pipe lines, fittings, etc., for extensions and improvements in municipal waterworks. Fund of \$190,000 has been secured through Federal aid.

◀ MIDDLE WEST ▶

Joseph Weidenhoff, 4352 West Roosevelt Road, Chicago, manufacturer of electrical equipment, parts, etc., has asked bids on general contract for one and two-story addition. Cost about \$40,000 with machinery. Frank Huddleston, 140 South Dearborn Street, is engineer.

K. & B. Packing & Provision Co., Stockyards, Denver, meat packer, plans early re-

building of part of plant recently destroyed by fire. Loss over \$150,000 with equipment.

Ackles-Hornkohl Co., 6112 North Mozart Street, Chicago, has been organized by Virgil E. Ackles and Alexander C. Hornkohl, to manufacture machinery and parts.

Superintendent Cheyenne River Indian Agency, Cheyenne, S. D., asks bids until July 23 for guy anchors, guy wire, wire clamps, machine bolts, lag screws, insulators, braces, remote-control switches and other electrical equipment.

Village Council, Walnut Grove, Minn., asks bids until Aug. 6 for water meters and connections. A. W. Olson is village clerk.

City Council, Sioux City, Iowa, has called special election on July 30 to approve bond issue of \$3,612,500, fund to be used for new municipal electric light and power plant, including transmission and distributing lines.

Plymouth Corn Products Co., Fort Dodge, Iowa, care of L. E. Armstrong, Fort Dodge,

head, recently organized, plans erection of several one-story buildings for new plant, to include boiler house. Cost about \$70,000 with equipment.

Spencer Kellogg & Sons, Inc., Des Moines, Iowa, manufacturer of linseed oil products, plans new storage and distributing plant, to include storage tanks and other equipment. Cost about \$80,000. Headquarters are at Niagara Square, Buffalo.

Delta Oil Products Co., Teutonia Avenue and Mill Road, Milwaukee, refiner and blender of industrial oils and greases, has placed contracts for a two-story addition, 67 x 110 ft.

Gordon Metals Corp., 627 East Polk Street, Milwaukee, smelter and refiner of non-ferrous metals, has purchased one-story building at 4200 West Monarch Street, containing 22,700 sq. ft., increasing floor space threefold. Occupancy will be taken immediately.

Northern Conveyor Co., Janesville, Wis., has been incorporated by E. J. Leach, who recently acquired all assets of defunct Northern Conveyor & Mfg. Co., and will continue the business. Walter Lagerman and G. A. Korthals also are interested.

City of Racine, Wis., has been allotted Federal loan of \$300,000 for improvements and additions to municipal water-works plant. Henry A. Nelson is commissioner of public works, and Walter A. Peirce, superintendent water department.

Emil W. Krug Mfg. Co., Manitowoc, Wis., manufacturer of tools, dies, metal stampings, etc., and Sunshine Specialty Co., Appleton, Wis., engaged in similar business, have been consolidated as Krug-Standish Corp., and plants are being merged in new quarters in Maertz Building, South Fourteenth Street, Manitowoc. Production facilities will be increased.

◀ MICHIGAN DISTRICT ▶

American Malting Co., 1919-20 Dime Bank Building, Detroit, Albert R. Moore, president, organized a few months ago, has plans for new two and five-story plant on 3-acre tract on Dix Avenue and River Rouge, lately acquired. It will include main malt works, grain elevator, dry kiln department, power house and machine shop. Cost over \$650,000 with machinery. Frank B. Northwood is general manager.

Michigan Alkali Co., Wyandotte, Mich., manufacturer of soda ash, alkalies and similar industrial chemicals, plans addition. Cost over \$500,000 with equipment.

Universal Water Purifier, Inc., 2626 East Genesee Street, Saginaw, Mich., has been organized by S. A. Raymond, 1002 State Street, and associates, to manufacture water purification machinery and parts, instruments, etc.

Voigt Brewery Co., Detroit, care of George A. Mueller, 1346 Broadway, architect and engineer, has plans for new brewery at Ferndale, Mich. Cost over \$100,000 with equipment.

◀ PACIFIC COAST ▶

California Brewing Association, 2060 East Forty-ninth Street, Vernon, Los Angeles, has authorized immediate erection of new plant at location noted, comprising six-story brew-house, three-story stock house, two-story bottling works, three-story power house, machine shop and other mechanical departments. Cost about \$600,000 with equipment. E. L. Chaffee is supervising engineer.

California Prune & Apricot Growers' Association, Fresno, Cal., plans one-story addition to local packing plant. Cost over \$35,000 with conveying, loading and other mechanical equipment. Plans also are under way for enlargement of branch packing plant at Dinuba, Cal., and installation of additional equipment.

Topaz Brewing Co., Tenth and G Streets, Modesto, Cal., plans addition to mechanical bottling plant. Cost about \$30,000 with equipment. J. H. Anderson is head.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 27 for 36 valve-reseating outfits (Schedule 2894) for Mare Island Navy Yard; light and power cable and armored telephone cable (Schedule 2901) for Puget Sound Navy Yard.

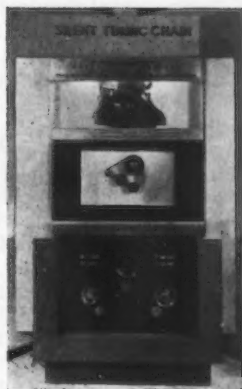
Helliwell Fruit Co., Chelan, Wash., plans extensions and improvements in building, recently acquired, with installation of conveying, loading and other equipment. Cost about \$25,000. A. L. Helliwell is general manager.

Blue Mountain Canning Co., Dayton, Wash., has work under way on new plant, with power

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POWER TRANSMISSION NEWS

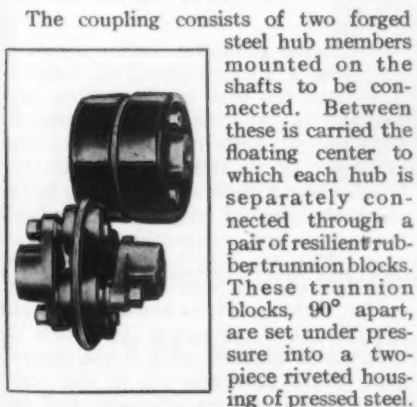
Stroboscope at the World's Fair



To show the slow movement and smooth action of Morse Silent Chains, the stroboscope is used by the Morse Chain Company in the Borg-Warner exhibit in the Travel and Transport Building at the Century of Progress.

New Application of Rubber in Power Transmission

A comparatively new type of flexible coupling is coming into more general use in connecting shafting and is replacing the conventional universal joint where the angular misalignment is not excessive.



The coupling consists of two forged steel hub members mounted on the shafts to be connected. Between these is carried the floating center to which each hub is separately connected through a pair of resilient rubber trunnion blocks. These trunnion blocks, 90° apart, are set under pressure into a two-piece riveted housing of pressed steel.

The blocks are molded over and permanently fastened to steel cores, or bushings. These steel cores, in opposite pairs, are rigidly bolted to the end hub members of the coupling.

The especially developed resilient non-cold-flow rubber blocks are responsible for the extreme flexibility of the coupling, providing for greater parallel and angular misalignment than any other coupling. These rubber blocks are all on a common center, equally radial from a common axis, consequently this coupling, at any angle, will run smoothly and true.

causing the motor to heat badly and causing difficulty with the bearings.

After the "Morflex" coupling was installed, the noise disappeared, the motor ran cool and the owner's coupling troubles were over.

As there is no metal-to-metal in the assembly, there is no rattle or wear, consequently no lubrication is ever required. Furnished in a variety of popular sizes, for from $\frac{3}{8}$ " to 3" shaft diameters.

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By the time any piece of equipment has rendered 20 years of service in any one plant, it may be regarded as an old friend. A prominent knitting mill in Rockford, Ill. (name on request), has 40 such friends in the shape of 40 Morse Silent Chain Drives that have been running for a generation. These are $2\frac{1}{2}$ " units, transmitting 13 h.p. between 17 and 49 tooth sprockets.



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MEET every transmission demand. Flexible, no power loss, low maintenance cost, low first cost, long life, chain drives give you definite performance and operating economies. Adaptable, can be applied to centers you want.

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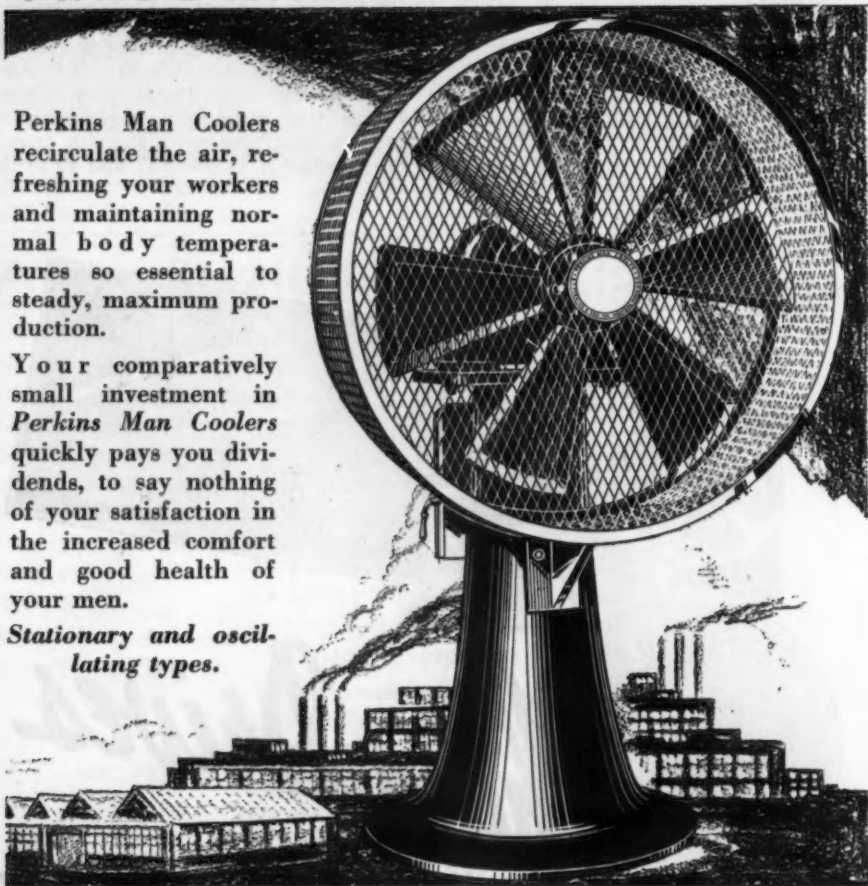
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Stationary and oscillating types.



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house, machine shop and other mechanical departments. Cost about \$200,000 with equipment. Minnesota Valley Canning Co., LeSueur, Minn., is interested in project. H. E. Crawford, Marwood Co., Walla Walla, Wash., is architect; Ralph W. Richardson, New York Building, St. Paul, is consulting engineer.

Richland School District, Bakerfield, Cal., care of Edwin J. Symmes, Haberfelde Building, architect, has authorized installation of manual training department in new school at Shafter, Cal. Bids will soon be asked on general contract. Cost about \$100,000. Architect noted is in charge.

Burns-O'Brien Disc Brake Corp., Los Angeles, has been organized by John W. Burns, Culver City, Cal., and Matthew D. O'Brien, Long Beach, Cal., to manufacture brakes and other mechanical equipment.

◀ FOREIGN ▶

Korean Nitrogen Co., Tokyo, Japan, plans new works for manufacture of cyanamid and

kindred products for commercial fertilizer service. Cost over \$400,000 with machinery.

Soviet Russian Government, Moscow, plans new wood pulp mill, for raw material supply for paper manufacture, near Onega, with power house and other mechanical units. Cost about \$1,500,000 with machinery. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency.

Oriental Steel Products Co., Ltd., Tokyo, Japan, plans expansion, including new mill for production of electric-welded seamless steel tubing, with facilities for manufacturing pipe from 1/2- to 5-in. diameter, and for additions to present plant for manufacture of steel safes and kindred products. Cost over \$500,000 with equipment. Company has work under way on new branch mill at Mukden, Manchuria, for manufacture of steel products for highway construction, etc., to cost more than \$400,000 with machinery. It is affiliated with Truscon Steel Co., Youngstown, Ohio. M. Yosumoto is president.

Consolidated Gold Fields of South Africa, Ltd., London, England, and 70 Pine Street,

New York, has organized Minerals, Ltd., capitalized at \$250,000, to operate gold-mining properties in Nova Scotia. New company will take over properties of Boston Richardson Mine, Goldbrook, N. S., and Cochrane Hill Mine, near Sherbrooke, Guysboro County, N. S., and plans installation of new equipment.

Warns Against Further Governmental Regulation

A WARNING against further governmental regulation which would stifle the individual initiative upon which the industrial leadership of the United States was erected was delivered on July 14 by George H. Houston, president, Baldwin Locomotive Works, Philadelphia, speaking before the Institute of Public Affairs at the University of Virginia, Charlottesville. Mr. Houston, who is chairman of the Durable Goods Committee, created last March at the request of Gen. Hugh S. Johnson, and vice-president of the National Association of Manufacturers, said that full regulation of society was but the restoration the ancient theory of "the divine right of kings—that the economic planners can do no wrong."

"While all recognize," he added, "that the insecurities of the recent depression years have been destructive of much of the material prosperity upon which we have prided ourselves, yet in seeking for the cure for this insecurity, great care is necessary not to so regulate and control the private affairs of our people as to discourage new enterprise and foreclose opportunity to the individual."

"National planning, in the sense of charging a specific group of individuals with the task of foreseeing and plotting the specific future course of economic progress of the country and of directing its infinite economic activities along such specific lines, holds the probability of tragic error, endless confusion and economic disintegration. The formula for business success has been defined as the capacity to be right a little more than half of the time. Success by such a formula is possible only if the aggregate of the economic life of the community is made up of many and diverse activities, each growing out of individual initiative."

"To the extent that these activities are regimented into large masses and moved simultaneously in one direction or another, we must be right all the time. If the business activity of the country is made up of several hundred thousand individual enterprises, each subject to the judgment and decisions of its own individual management, the composite judgment is likely generally to be in the right direction. Many of those going in the wrong direction will be sufficiently responsive to environment and circumstance to change their course in time so that the composite progress

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problems are solved
by the correct com-
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Tramrail units.*

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By applying up-to-date methods of materials handling, it is possible to secure appreciable savings in manufacturing costs, overhead costs and numerous general costs. But be sure your methods are up-to-date. Before you invest in materials handling equipment INVESTIGATE Osborn Tramrail Systems.

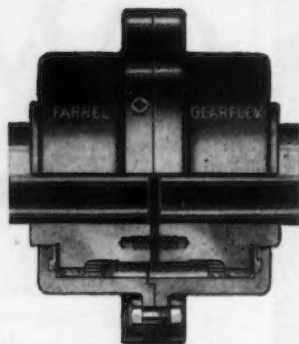
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Sectional View of Farrel Gearflex Coupling showing gear teeth and oil chamber.

16 standard sizes from 2½ inch to 20 inch bores and special designs for individual conditions.

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will be forward. If, however, these hundreds of thousands of individual enterprises are set within a rigid frame of government direction, based upon an economic plan of national scope, progress will be in the right direction only so long as the individuals who conceive and direct the plan are right. When wrong, the result will be catastrophic and utterly destructive. Where are we to find the superintendents qualified to do our thinking for us or the administrators to direct upon such a scale and with such a responsibility? By what justification are we entitled to replace the composite understanding and judgment of the people as a whole by the understanding and judgment of a very few? Does human experience justify us in organizing our society in such manner as to require such human infallibility?

"Are we to turn back to the theory of the divine right of kings—that the economic planners can do no wrong? If so, I fear we will suffer as did the nations of an earlier age under the domination of such kings.

"Existing unemployment is centered in the field of durable goods and particularly in construction. Recovery in this field can be accomplished only through a restoration of price parity, of confidence in the future, with stimulation of forward-looking enterprise and provision of adequate credit upon attractive terms. The credit supply appears to be available but the confidence is lacking and price parity is not in evidence. The future ability of the durable goods industries to recover is dependent upon the continued rapid turnover of the country's inventory of durable goods including the facilities of living, as well as those of industry and commerce."

British Iron and Steel Production Maintained

LONDON, ENGLAND, July 17 (*By Cable*).—Steel ingot production in Great Britain during June amounted to 757,500 gross tons, a slight decline from the 780,000 tons turned out in the preceding month, although May had one additional working day. The daily rate of output was slightly higher in June. In June, 1933, only 568,800 tons was produced.

Daily production of pig iron was also higher in June than in the preceding month, although the total was off slightly because of the fewer working days. June pig iron output was 515,700 tons, compared with 529,900 tons in May and with 345,600 tons in June, 1933.

Monthly production in 1933 and the first six months of 1934 was as follows:

	Pig Iron	Steel Ingots
1933		
Jan.	286,600	444,400
Feb.	270,800	482,700
March	332,200	577,700
April	324,700	509,600
May	339,900	599,600
June	345,600	568,800
Six Months	1,899,800	3,182,800
July	343,900	567,500
Aug.	362,700	551,300
Sept.	359,700	669,000
Oct.	373,300	668,300
Nov.	374,900	695,000
Dec.	409,300	668,900
	4,123,600	7,002,800
1934		
Jan.	441,300	711,000
Feb.	414,400	707,500
March	503,600	829,700
April	496,300	716,800
May	529,900	780,000
June	515,700	757,500
Six Months	2,901,200	4,502,500

Unfair Trade Practice Committee Reports

WASHINGTON, July 17.—The Business Advisory and Planning Council for the Department of Commerce has made public a report of its committee on unfair trade practices in production and distribution in which it is stated that the committee has been instrumental, through the cooperation of NRA, in including a provision for the establishment of joint committees to agree upon unfair trade practices in approximately 200 codes.

The report was made to the council by Lincoln Filene, chairman of the committee, who pointed out that the committee has drawn a distinction between the two categories of unfair trade practices, namely those which occur in the affairs of competitors and have the effect of giving one manufacturer or one merchant unfair advantages over another manufacturer or another merchant, and practices used in the dealings between members of the same industry but in different stages of distribution; as between a manufacturer and a wholesaler or between a manufacturer and a retailer.

According to Mr. Filene's report the committee, which is primarily concerned with the second of these classifications, is now concentrating upon the actual organization of joint committees for the enforcement of the provisions in codes forbidding unfair trade practices. A simple plan of organization and operation applicable to any industry for the enforcement of its unfair trade practice provisions has been drawn up and is recommended by the committee.

The report stresses the immediate necessity of preparing for self-government by business and expresses the opinion that this can be accomplished with respect to unfair trade practice problems by the universal organization on the part of business of joint committees for the determination of unfair practices. In the committee's opinion this arrangement permits the settling of almost all unfair trade practice questions with the minimum of aid or interference from the Government.

Industrial Advertisers Meeting at Cincinnati

PLANS are far advanced for the national conference and convention of the National Industrial Advertisers Association which is to be held in Cincinnati Sept. 20-22. William E. McFee, president of the Cincinnati chapter of the association, is directing the formation of the plans for the gathering. The program is in general charge of Gregory H. Starbuck, General Electric Co., Schenectady, N. Y.

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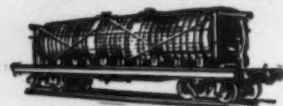
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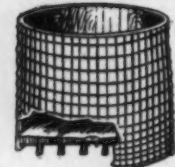
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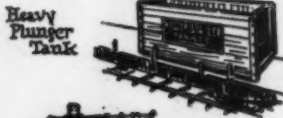
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Industry and Agriculture Have Common Interests

(Concluded from Page 13)

from the agricultural administration's standpoint. There is a very famous saying by a very famous man that no nation can endure half slave and half free. It could be quite truthfully paraphrased by the statement that "no state of economy can endure that is half regimented and half self-governed." Regimentation, under bureaucratic control, is the antithesis of self-government through cooperation. The schoolboy does not cooperate; he obeys the professor.

Agriculture and industry, in America, are blood brothers. What helps one will help the other and what will hurt one will injure the other. We

must recognize this close relationship of mutual interest. United, we may stand; divided, we will surely fall.

Industry in America was born of the rib of agriculture, just as Eve was born of Adam. It has inherited the sterling qualities of the pioneers who wrested their living from a hostile soil and environment. We may have grown apart during the years of easier going, but blood will tell in the long run and when the test comes.

Today our problems are common problems. We should renew our kinship now in behalf and defense of economic self-government through cooperation.

Wrought Iron and What Determines Its Quality

(Concluded from Page 27)

be a few hundred thousand filaments per square inch in well-worked wrought iron. It is but natural, therefore, that the microscope has become the most useful adjunct in the study of wrought iron and in fixing quality standards. Preparation by polishing and etching follows the general procedure used in metallographic study.

The microscope will disclose:

(a) Pearlitic areas due to carbon and resulting from incomplete refinement in prevalent methods of manufacture of wrought iron, or from adulteration with steel scrap of moderate carbon content. The manner of distribution of the carbon will quite generally serve to distinguish between these two causes.

(b) Type of slag and its distribution such as coarse slag pockets, fine textures resulting from heavy rolling reductions, or the absence of normal slag content in raw or "steely" areas.

(c) Unusual characteristics of structure, such as coarsened grain caused by overheating, high phosphorus "ghost lines," or other abnormalities.

The microscope will not detect alloyed manganese, silicon, copper, or other constituents existing in solid solution with the base iron.

The subcommittee making the report was headed by Prof. James Aston, whose wrought-iron process

has been developed by A. M. Byers Co. The others associated with him were: William Downs, Burden Iron Co., Troy, N. Y.; J. H. Higgins, Camden Forge Co., Camden, N. J.; G. E. F. Lundell, Bureau of Standards, Washington; F. B. Olcott, U. S. Navy; C. T. Ressler, Reading Iron Co., Philadelphia; J. B. Schlossberg, Highland Iron & Steel Co., Terre Haute, Ind., and E. B. Story, A. M. Byers Co., Pittsburgh.

Choosing the Right Drive

(Concluded from Page 25)

When the load shaft rotates faster than the prime mover shaft, or free wheels, the cams allow the cam ring to slip past them freely. The device will operate in either direction, depending on how the cam assembly is mounted on the drive gear. This device is suitable for all speeds up to 3600 r.p.m. and is not affected by centrifugal force. It is constructed of nickel alloy steel and can be obtained in horsepower capacities from fractional to 100 at 100 r.p.m. In its free-wheeling capacity, in addition to direct rigid connection, it is applicable for direct flexible connection by either chain, V-rope or flat belting. Sheaves or sprockets can be either mounted or cut on the exterior surface of the cam ring and flat belting can operate direct on the cam ring.